VIETNAM

Agriculture rehabilitation Project
Rubber rehabilitation component

Jean Campaignolle

27July - 11 September 1995

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Summary

Terms of reference (short-term consultant)

TERMS OF REFERENCE

SHORT-TERM RUBBER PLANTATIONS ADVISER

The short-term consultant appointed to provide preliminary technical inputs, prior to the arrival of the long-term resident adviser should, during the 2.5 months of his mission, focus upon the principle requirements of points 'c.', 'd.' and 'e.' of the Terms of Reference of the long-term adviser.

He should therefore concentrate upon the following :

Carry out a rapid programme of visits to each of the ten State Rubber Companies (SRCs) of the project to examine/ review standards of plantation management husbandry which, in the following order of priority, will lead to -

Firstly, the identification of training needs and, in concert with the resident GRC Training Adviser, assist in the organisation of appropriate training courses and in the preparation of training aids and materials as required.

Secondly, advise the GRC and the SRCs of the recommended best plantation management husbandry practices, and ensure the transfer of expertise in so doing.

Thirdly, monitor the application/use of the agricultural inputs procured under the project and supplied to the SRCs (stimulant, fungicides, weedicides and fertilisers).

A Mission Report should be prepared in English, prior to departure, and presented to the PCU at an end-of-assignment seminar.

Mission report

Identification of training needs and assistance in the organisation of appropriate training courses and preparation of training aids and materials required.

The needs are substancial. They consist of training personnel and equipping it so that it can carry out its work well. Success depend on a combination of knowledge and facilities.

Training researchers (acquiring knowledge)

Operations should start with the training of IRCV researchers, who should gain knowledge by themselves and / or pass on their knowledge to others. There are several ways of doing this.

Short term fellowships

Stays in other countries lasting from 2 weeks to a month are to be planned in most fields, and in any case in those that have received aid from the World Bank. This concerns qualified researchers in the following divisions :

- Physiology/Exploitation (tapping, stimulation and latex diagnosis),
- Agrochemistery (this covers the problem of fertilisation as the work concerns the second or even the third generation of rubber trees, because plowing has been over-used on the pretext that there are plenty of men and machines and finally intercropping has been used frequently in the three first year of cultivation).
- and Crop Protection (problem of *Imperata* control, care to be applied to trees in case of *Corticium salmonicolor* and *Phytophtora palmivora).*

Various IRRDB institutes would seem to be highly suitable for training these researchers :

- Physiology/Exploitation : CIRAD-CP, Rubber Research Institue of India (RRII) and possibly the Rubber Research Institute of Malaysia (RRIM), etc..... which have performed work in tapping, stimulation, tree panel dryness, latex diagnosis, etc...
- Agrochemistry/Fertilisation : among others, the Indian and Malaysian institutes have long experience in fertilisation and mineral (and possibly organic) monitoring of rubber tree nutrition using soil and leaf analyses. An important role should be given to the computerised processing of analyses and calculations.
- Crop Protection : India, RRIM, CIRAD-CP, etc

However, other institutions are also qualified to administer such training:

- for exemple, two years ago an Indian researcher was awarded a grant for further training in tissue culture in the United States within the framework of an operation programmed by the International Rubber Research and Development Board (IRRDB), which associates all the natural ruber research institutes in the world, for training 8 IRRDB member-institute researchers per year; the Vietnamese Institute (IRCV) has also benefited from this;
- more recently, Rothamsted Experimental Station (UK) has agreed to train researchers for the IRRDB for periods of several months. Four such courses are planned for 1995.

Furthermore, some researchers of IRCV must be able to attend the IRRDB annual meeting. In 1995 this meeting will take place in Penang, Malaysia. 3 persons could go there.

Overseas masters degrees

Work can be done on "theses" for more in-depth basic training in a neighbouring country through the national rubber research institute. Malaysia has just accepted two post-graduated students from IRCV -one for training in Physiology/Exploitation and the other in Agrochemistery (fertilisation).

In the present case, for either a short term fellowship or an overseas master, the candidate for training does not have to concern himself with the expenditure on staff and equipment incurred by the host. It is up to the host institute to charge the institution that has sent the person to be trained.

Technical Assistance

It is the second possible way of training IRCV researchers. The person administering the training is invited in this case. Visits by high-level persons can last for two weeks to à month, during which their expenses (and their fees) must be covered and working facilities provided : lecture room, vehicle, equipped laboratories, etc.

For example, teaching in Physiology/Exploitation cannot be conceived without an appropriately equipped laboratory. In this case, the consultant chosen must explain how to use the equipment in the best way. This is especially in projects like the present WB operation in which the equipment has been completed as best as possible. Something might well be lacking, ...for example a generator set to run it all.

However this may be, the following aspects must be explained in order to set up a latex diagnosis system :

-how to make sampling of latex in the plantation lock in question (number and distribution of samples per unit area of clone, the latex sampling technique to be used according to the parameter to be analysed -there are generally 4 parameter-, the equipment to be carried in the fields and the question of transport);

-once the samples have been taken to the laboratory, how to analyse them with the apparatus available (this question will have been settled in advance);

-how to use the raw data and interpret the results according to clone, tree age and tapping, in short in the light of the tree "past";

-finally, what should be said to the planter to possibly enable him to adjust his tapping system.

Likewise, the following aspects must be examined in the analysis of the nutritional state of a stand (clonal) :

-how to take soil samples and possibly leaf samples (number and distribution of sample per unit of clone area -this is not easy for leaves- and the time when sampling should be carried out,etc...);

-how to analyse the soil samples and leaf samples when they have reached the laboratory (preparation of samples for analysis and the analysis themselves, etc...);

-subsequently, how to interpret the results of analysis in the light of the clone, the fertiliser applied in the past, etc..

-finally, the fertiliser recommendations to be made to the planter for the plot in question.

The laboratory must also be ready in terms of equipment and staffed by qualified persons. There is a major disadvantage in the system of equipping a laboratory and simultaneously sending its staff abroad for training. There is no point in having a perfectly equipped laboratory that the staff cannot use properly. It is better to devote a few weeks to training and then be able to run the laboratory properly.

However, there is a limit to this reasoning that is reached in the case of overseas masters when the persons concerned stay abroad for two or three years, in particular to write a thesis. Experience has shown that when they return to their country with their new qualification, they consider that they merit better than what their institute -IRCV- is able to offer them and they leave for the pivate sector. There are recent examples of this :

-two successive former heads of the Physiology Division left IRCV after many training courses abroad to enable them to make the most of their laboratory;

-likewise, the former head of the Agrochemistry Division, who was beginning to acquire good mastery of her field and who had started up the IRCV soil and leaf analysis laboratory, was transferred to the Board of GRC.

There are two ways of solving this problem :
(1) pay IRCV researchers better salaries ; it is generally agreed that the pay is not attractive;
(2) have the researchers sign contracts before they go abroad in which they undertake to stay with IRCV for 5 years when they return with their new qualification. This measure is beginning to be applied.

Training planters (transfer of technology)

The need of training may involve planters who display a certain degree of open-mindedness or even legitimate curiosity. There is no reason to deprive them of knowledge, at least in general terms. One does not do well what one does not understand and not understanding may lead to lack of interest in the subject that is bad for the work to be done or simply for the operation of setting it up. The planters should therefore be given the full details of what is suggested that they should do on their holdings, especially concerning the work involving laboratories (Physiology / Exploitation and Agrochemistery). All opportunities should be used, such as visits, talks, etc..., not forgetting IRCV brochures and leaflets that can go further into explaining such subjects.

In addition, various components of some techniques can be assigned to the plantations, leaving the laboratories to play their true role. Planters could be trained to take soil, leaf and latex samples, etc. It is not very difficult but requires knowledge. The samples collected would then be sent to IRCV for subsequent opérations.

In any case, all the knowledge gained is finally aimed at the plantations. IRCV has two possible lines of approch :

- either showing the results obtained at the Institure itself,
- or organising a demonstration at a plantation and inviting the other planters to attend.

This is the role of the **demonstrations & seminars** funded by the WB.

There have been many of these demonstrations and seminars in recent years. The following can be mentioned :

- past events with local funding :

    . 1994, a demonstration at Laikhe of results using :
        . glyphosate (to replace labour and machines)
        . validamycine (to replace Bordeaux mixture)
        . ridomil (to replace difolatan which has been forbidden);

- future operations to be prepared (and proposed for WB funding) :

    . 1995, demonstration of new clones at Laikhé and Dong Phu, a seminar organised by the Breeding Division;
    use of agrochemicals in disease and land control + demostration of spraying equipment, a seminar organised by the Crop Protection Division.

Needless to say, oral instruction must be backed up by one or more documents setting out the ideas, listing the results of analyses and showing prices. There is no doubt that if planters are convinced by the talk (and the low prices), they will want to repeat the experiments on a semi-industrial scale on their own plantations. One person is enough to lead the others.

This written work is important. IRCV researchers should devote themselves to it not only because it is an opportunity for them to clarify their ideas but above all because it provides scope for handling any objection to the application of a new technique. In fact, they do this.

This paper has been given to the Adviser Consultant of GRC.

Advise the GRC and SRCs of the recommanded best plantation management and husbandry pratices and ensure transfert of expertise.

There is no question in the project of defining the various plantation technique one by one.The most important one will be examined.

-Land preparation

In the light of what we have seen, land preparation is performed with care. Previous generation rubber trees are felled and maximum used is made of the timber. It should not be forgotten that the sale of timber covers the funding -at least for the moment- of a large proportion of the replanting costs, while still allowing local population to collect small wood for domestic needs. Wood is becoming increasingly scarce in many Asian countries and rubber wood will play an increasingly important role in plantation economies. There is even talk of making rubber a crop with the twofold objective of producing latex and Wood.

-*Imperata* control

This must be performed vigorously. It is unanimously considered that glyphosate treatment gives good results. The CDA, an individual knapsack sprayer running on a small built-in electric motor, is easy to used (mainly for the young *imperata*)

-Densities

It is a fact that low density areas are observed in old plantations. Wind breakage is difficult to prevent although clone reputed to be resistant can be chosen. In this respect, PB 235, which is extensively planted in Vietnam, is perhaps not the best choice.

One way of compensating for loss by wind breakage in advance is to plant at a higher density. Planting used to be carried out on a 5m x 5m square basis which thus gave 25 m2 per tree and 400 trees per hectare. However, things have changed and densities are reported to be as follows :

-in red soil : 6m x 3,5m; i.e. 21 m2 per tree and 476 trees per ha ;
-in grey soil : 6m x 3m, i.e. 18 m2 per tree and 555 trees per ha.

It is noted that there has also been a change to a rectangular layout. This makes the tappers' work easier and finally results in a possible increase in the number of trees tapped in each tapping task.

Until proved otherwise, these planting systems are suitable.

-Planting

Planting is carried out well with perfect alignments in both directions.

It is noted that near the equator an east-west alignment affords better exposure to sunlight for intercrops than a north-south alignment.

Three main clones are used in the GRC estates : GT 1, RRIM 600 and PB 235. This is few and even very few. More than half of the area of some estates consists of PB 235. One might say why not these clone ? But there are others. It is necessary to progressively enlarge and diversify the genetic base of the estate. About ten different clones would be a reasonable target, with each of one represented in proportion to its agronomic and economic interest.

In addition, the budwood garden should be "authenticated". Genetic identification methods (electrophoresis) exist. The annual plantings and replantings in the 1980s were very large (several thousand hectares per estate per year). This necessarily required intensive vegetative multiplication and unfortunately this carries a risk of error. In any case, the estates contain a number of trees with failed budding, leading to a variety of trees,-some still seedlings and the others budded.

A return to estate plantings and replantings of more reasonable dimensions will be an opportunity for improving the quality of work.

It is noted that a tissue culture plant production technique (somatic embryogenesis and microcutting) has been tried at IRCV. The department manager has left but the work should be started again.

-Intercrops

The need of local inhabitants to grow intercrops can be understood :

. they enable villagers to grow food while working on the land entrusted to them (they also have to maintain the corresponding rows of the rubber trees);

. estate managers have smaller maintenance expenses for young plantings.

It is reminded that some intercrops are beneficial for rubber (soya, groundnut), others are merely acceptable (rain-fed rice and corn) and others should not be grown (cassava).

In addition, the fertiliser purchased within the framwork of the WB project is not intended for intercrops.

-culturale methods

One learnes at school to touch the surface roots in a stand of trees as little as possible.

Any machine passage that may break these surface roots should be avoided. It is true that machine passages in interrows in the early years when the roots hardly extend beyong the vertical line of the edge of the crown do not risk breaking roots. However, later, when the roots have extended into the interrows, machine runs should be avoided. But at least three runs were recorded : the first during *imperata* control (which must be ploughed in at the start of the dry season) and the two others during the placement of fertiliser (in spring and autumn).

Now that glyphosate is available, there is less fear of this problem as i*mperata* control is generally carried out in young plantings.

There remains the question of fertiliser, which is spread for many years. Fertiliser placed in the field must be dug in and this is the problem because a large proportion of the surface root system is cut during the operation. The "blind drain" technique exists in which permanent holes are dug for the fertiliser, but this encourages theft. In short, the problem still requires a solution.

-monitoring of growth and production

A fine rubber tree is one that grows fast and well. The planter must know whether or not the growth of a certain clone is normal so that he can take any necessary steps (e.g. fertilising) to try to remedy an unwanted situation in time. As it would be impossible to measure all the trees, representative specimens should be chosen for measurement in each clone block.

Likewise, it is important for a planter to know his production. The daily collection records alone (with DRC measurement) give a good idea of production potential. Abnormal deviation should be monitored from one task to another or even in the same task monitored two tapping days running. The daily records should be compared with the factory figures a the end of each month. This type of work should be carried out clone by clone according to the age of the plots.

This kind of monitoring should be computerised using programs designed for the purpose (such programs must exist). This should be one of the first tasks to be carried out.

-Fertilisation of young plantings

Application of WB fertilizer is in principle limited to immature crops + 1 year. Of course, applying fertiliser to mature crops does no harm, especially to the second or even the third generation of rubber trees and when there are many intercrops which draw soil resources to varying degrees from the second generation of rubber onwards ; however, the real advantages are disputable at the least

Application of fertiliser should in time be performed on the basis of recommendations following soil analysis, subsequently accompanied by leaf analysis. It is noted that leaf analysis is only truly useful if the leaves are chosen on shoots with limited growth in the leaf crown ; this means that there must be a leaf crown or at least the beginning of one (seldom before the tree is 3 or 4 years old).

Sampling of soil and leaf is difficult to perform well (number of samples per unit area, sample distribution in the area, etc..). Unless the techniques are fully mastered, it is better to leave these operations to people who are used to them.

IRCV possesses a well-equipped soil and leaf analysis laboratory at the disposal of planters. They should make an agreement with IRCV to establish a common programme of sampling and analysis (on a paid basis).

-Disease control

Treatment is carried out regularly to control *Corticium* and *Phytophtora*, taking into account constraints of nuisances and progress made :

. Bordeaux mixture (with scraping) is being replaced by validamycine (without scraping) ;

. difolatan (no longer authorized) is replaced by ridomil (authorized).

No remarks are called for on this subject.

However, researchers are interested in some diseases such as *Oïdium*, which causes the fall of young leaves during refoliation, and they are examining treatments. This is a job for IRCV. It should be mentioned that in Brazil, where national rubber production is strongly compromised by *Microcyclus ulei* (a leaf disease not found in Asia and Africa), researchers have yet to find a satisfactory control method. Likewise, in Gabon, no satisfactory control method has been found for *Colletotrichum* which has decimated some plantations. It is doubtful whether a method will be found to prevent leaf shedding caused by *Oïdium* or to control *Phytophtora*, etc. A start could be made by choosing clones that are resistant to leaf diseases.

Finally, it is useful to "see" what has been done in disease control. It is therefore suggested that spray products should include a dye so that the treated plots can easily be identified.

-Tapping

Estate production is small although tapping is good or even very good.

Tapping is generally of the S/2 D/3 D/4 type with no stimulation. This is precisely half the tapping intensity used in the past when the trees were also stimulated. One might wonder whether the trees are not "sleeping" to a certain extent. GT 1, a clone grown on the same land in Vietnam some thirty years ago, yielded about 2 tonnes per hectare for years with S D/3 D/4 stimulated tapping. What is the explanation ? Is it theft (secondary qualities) ? This is possible, when one hears that 10 000 tonnes of rubber is sold illegally in Vietnam; Is it because of soil fatigue caused by large scale intercropphg and the fact that the second or third génération of rubber is now being grown ?

Finally, are the trees true GT 1 (it is known that there are two in Africa and one yields twice as much as the other) ?

One could begin by stimulating them. Yield increase of 30 % has been reported under stimulation. In addition, they could be stimulated without waiting for 5 years before starting. Indeed, if the trees are opened for tapping at 7 years old, this means stimulating from year 13 onwards. The question arises of whether, if a stimulation period is to be chosen, it might not be better to stimulate at the beginng of tapping rather than apply the technique to older trees.

Using latex diagnosis (L.D.) would be a way of forming an opinion. It is reminded that this method is used to define optimum tapping intensity making it possible to avoid production loss resulting either from over intensity of tapping leading to bark dryness or from letting trees "sleep". The IRCV would have to be asked to carry out this work. There is a well-equipped physiology laboratory at Laikhe available to planters for this D.L. work.

The problem of RRIM 600 is similar to that of GT 1. It is a clone than can be normaly stimulated.

It is generally only necessary to be very cautious with more recent clones such as PB 235. This clone naturally gives its maximum and hardly needs stimulation. Let us say that it should be stimulated with care and with the plots in question subject to L.D..

Stimulation should be considered as a normal operating technique.

This information will be handed to the GRC which will distribute it to planters. In discussing it, the planters will become involved in the process of transfer of expertise.

But mainly, at the occasion of each of the 11 visits (plantations and IRCV) realised by the Consultant during his mission, the management were engaged in the process of transfer of expertise.

Monitor the application / use of the agricultural inputs procured under the projectand supplied to the SRCs (stimulant, fungicides, herbicides and fertilisers).

The 10 plantations + IRCV were visited at the rate of one per day, followed by the time required to write notes (1 day for each).

The 11 individual notes are provided as an annex. The reports can be recapitulated as follows.

Herbicide

This consists only of glyphosate for *imperata* control. This weed is found in all the plantations although the quantities vary.

Glyphosate orders have been as follows overall :
-1994 :approximately 29% of the requirements as assessed by the WB
-1995 :approximately 60% of the requirements.

The individual orders were staggered as follows :
-1994 : 200 l.to 12 000 l.
-1995 : 600 l.to 12 000 l.

It is clear that before adopting a new product and abandoning the old method (removal of *imperata* by hand and by machine), planters wished to gauge the results themselves.

The 1994 order has arrived and has been used. Some planters have stored some and, in constrast, others have had to borrow herbicide or even buy some on the local market.

The 1995 order should bring the situation back to normal -although the quantity is far from the requirements calculated by the WB- but it has not yet been delivered.

The 1996 order is not discussed here. It will be GRC's task to examine the question with the estates at the end of the year.

The results range from good to very good (better than dalapon). This accounts for planters' enthusiasm for glyphosate which is not only effective but also avoids unwelcome runs by machines between rows twice a year.

It was also planned to order sprayers -C.D.A. very low volume sprayer- (roughly 3 litres per ha in rows and 6 litres per ha in interrows). This knapsack apparatus has its own power supply (battery).

Quite a large number of planters have ordered C.D.A. sprayers (75 in 1994 and 120 in 1995). It seems that there is a problem of use : it is easy to spray little -developed *imperata* or cut back plants but it is difficult to handle-developed *imperata* (unfavourable sprayer position especially in wind, which is important for interrow crops). Knapsack sprayer with manual pressure systems are used in this case (they are made locally and are cheaper).

Only one plantation has ordered a large spraying machine. Ample labour is generally available. In addition, the growing of interrow crops is fairly widespread and this prevents the use of large spraying apparatus.

Glyphosate "works well" as a whole.

Fertilisers

These are N, P and K fertilisers in the form of urea, potash and phosphate (Vietnamese rock phosphate).

The orders made by planters in 1994 all attained precisely the maximum allowed by the WB. The 1995 figures are not as precise as those of 1994 but as a whole they all exceeded the quota, as can be seen below :

urea	+ 18%
potash	+ 6%
rockphosphate	+ 16%

This means that fertilisers form an essential question for planters.

The 1994 orders have all been used. The 1995 orders have not been delivered except for potash in certain cases. The question of 1996 remains to be seen but there will certainly be requests for fertiliser?

The fertiliser is intended for young plantings + 1 year. Neither intercrops (management of these is completely separate) nor mature rubber trees are included. This does not prevent planters from purchasing fertiliser on the market for application to their mature trees (this practice stops when the trees are about 20 years old).

Fertilisers are generally mixed when they are to be used and placed in two operations : the first at the beginning of the rains and the second at the end. They are transported to the site of use by cart (tractor-drawn or other) and then labourers in the plantation perform spreading.

Fertiliser formulas vary according to crop age and soil type (more fertiliser is applied to grey soil than to red soil). The GRC sets fertiliser placement standards.

To the best of my knowledge there are no specific formulas for clones, although the stock would be more concerned here. It would nevertheless be simple for the young crops as there are only 3 clones : GT 1, RRIM 600 and PB 235. The agrochemistry laboratory (soil and leaf analyses) is only just beginning to be used for possible adjustment of the GRC fertiliser formulas according to clone (they play a role in uptake), soils (as the division between red and grey soils is rather summary) and in general to all features of the season and the place.

Some planters report a visit by Laikhé researchers to collect soil and leaf samples in their plantations. They seemed satisfied. Once the researchers who are abroad for a while have returned, this laboratory should be able to work at a normal rate (1 000 to 2 000 samples per year) on the basis of signed (and paid) contracts.

Fungicides

Two common diseases require control : *Corticium salmonicolor* (on branches) and *Phyptophtora palmivora* (on the tapping panel).

Corticium salmonicolor

Bordeaux mixture (CuSO4 and lime) was the only substance used until now. Things have changed. Although there is a certain amount of reticence here and there to abandon Bordeaux mixture, the gradual change to validamycin is accelerating.

Orders in 1994 totalled 90.7 tonnes of CuSO4 and 398.5 tonnes of lime (these figures were far from the requiremnts at the time : WB estimates showed that the planters could have requested up to 324 tonnes of CuSO4 and 1,847 tonnes of lime, i.e. more than four times the initial quantities) and fell to 15 tonnes of CuSO4 and 70 tonnes of lime in 1995. In contrast, requests for the substitute validamycin increased from 13,300 litres in 1994 (received and used) to 62,600 litres in 1995 (not yet delivered).

It is true that treatment of *Corticium* with validamycin does not required the scraping of the affected parts of diseased trees as is needed with Bordeaux mixture for a result that is at least as good since all the pink color disappears after treatment. This is the only criterion available for judging the effectiveness of the product as planters do not add a dye to the product whereas with Bordeaux mixture the white of the lime is clearly visible on the truncks and branches. Would it not be possible at least to mark the trunks ?

Two products are proposed : one Chinese and the other Japanese. The Japanese product was favoured as it is more active but the contract was won by the Chinese product as the price was substantially lower.

Phytophtora palmivora

Treatments for black stripe disease are known well by all the planters. Difolatan, antimucyin and similar products are forbidden. "Ridomil", a product based on metalaxyl-mancozeb, is the authorized product used.

The 1994 order for "Ridomil" was 13,262 kg (received and used). The 1995 order is for 18,876 kg (not yet received).

The observation for validamycin also applies : no dye is mixed into the product to mark the bark to monitor applications as the tapping cut descends. The only criterion showing systematic treatment is the absence of black stripe. This is in fact difficult to observe.

Stimulant

Stimulation trials were performed before WB intervention but at very cautious levels.

With WB support, stimulation is now starting to be used as a normal exploitation technique. The rules laid down are still very light but take clones into account (some of which should be stimulated and others not), and the age of the trees (stimulation generally starts 6 years after the opening of the trees for tapping). Stimulant concentration is also modulated. As tapping is normally S/2 D/3 D/4, stimulation is possible and some clones must be stimulated.

Orders totalled 231,600 litres of ethephon in 1994 (of a potential of 328,000 litres according to WB) and 226,000 litres in 1995. However, although the 1994 order was received and used, there is still no sign of the 1995 order.

Individual cases vary. In 1994, some estates such as Phu Rieng, Loc Ninh and Dong Phu took their entire requirements according to WB.Others took nothing (Dau Tieng). The remaining estates took only a part of the stimulant proposed by the WB.

The same kind of contradiction is observed in 1995 (order not delivered) : some estates are convinced of the advantages of stimulation and have requested more than in 1994 (Dau Tieng took nothing last year and is making a small effort with 1000 litres and Dong Nai has asked for more than its share).

Some estates are taking less than last year (Dong Phu, Loc Ninh, Binh Long and Tay Ninh). Finally, between the two extremes, some estates have repeated their 1994 orders (Phuoc Hoa and Phu Rieng). Planters are hesitant about the line to take, to say the least.

Appreciable increases in production have nevertheless been observed. Gains have been of 20% to 30%, which carries no risk of exhausting the trees, especially if the latex diagnosis is used. This is the most reliable way of achieving optimum production in the context of this production.

A laboratory in Laikhé is especially equipped (with a contribution by the WB) for the purpose. Trials have been carried out on estates where planters say that they agree to continue to work with Laikhé and sign a contract. Tapping intensity is very low (S/2 D/3 D/4) and stimulation cannot be refused as long as precautions are taken to avoid over-intensive or under-intensive tapping both of which lead to production losses.

Even if the latex diagnosis (L.D.) only prevents, on 10 % of the area, 5% of the loss (50 kg/ha of rubber in yields at 1 tonne/ha) for either of the reasons above, the laboratory will pay for itself. One sample per 25 ha would result in a "gain" of 25 x 5O kg = 1250 kg of rubber, the 10% on which is $US 125. This should be compared to $US 20 forming the cost of the analysis enabling the saving.

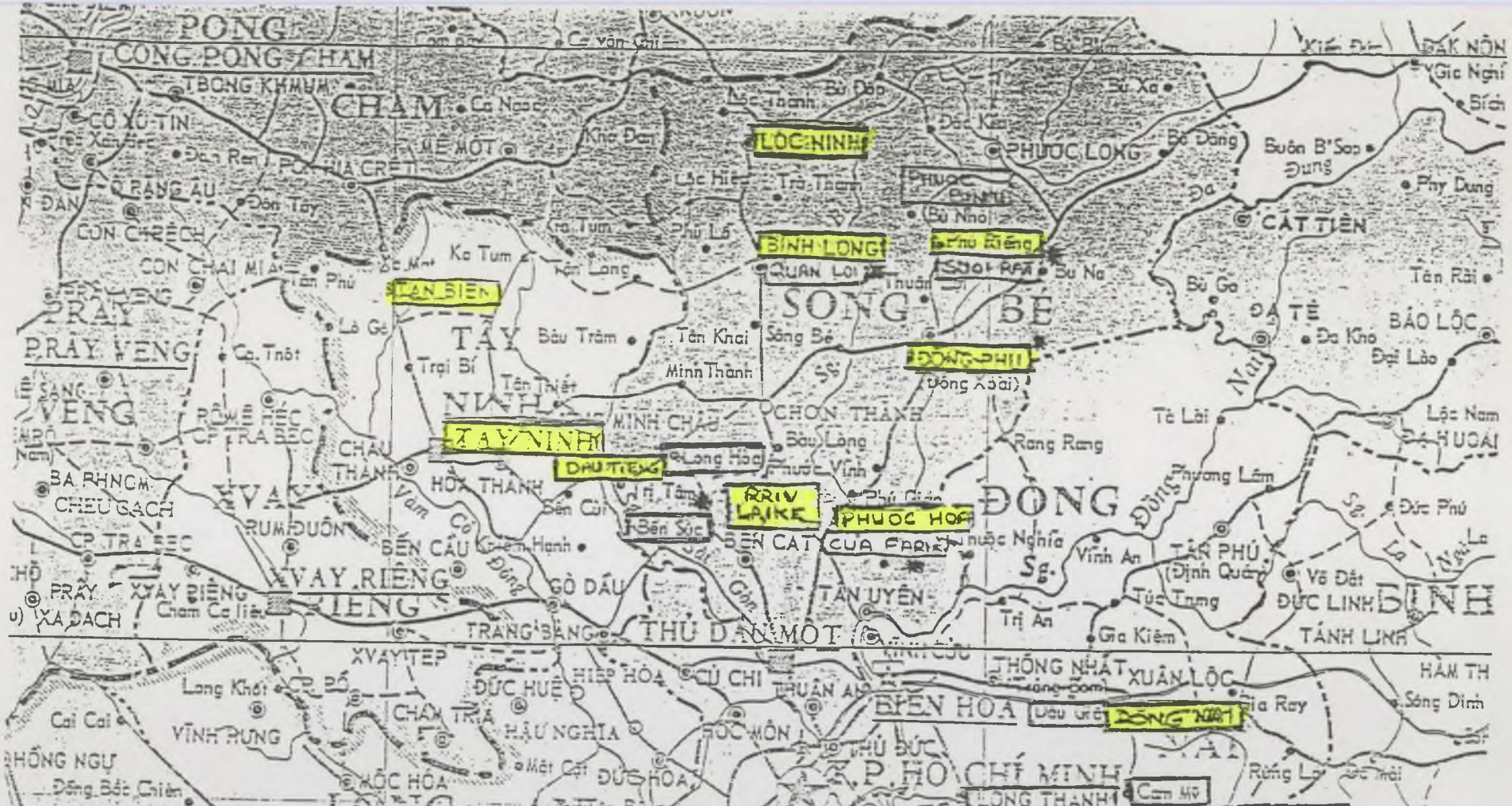
It is true that it is difficult to rely on the laboratory while sevices it provides are unreliable, if only because it is understaffed and the services rendered are hardly covered by payment.

Conclusions

As a whole, the planters are playing the game honestly. The techniques proposed for treatment of *Imperata*, *Corticium* and *Phytophtora* were adopted rapidly. There is no need for encouragement to use of fertiliser as they take the maximum each time. However, use of fertiliser should be backed up by soil and leaf analyses. It is hoped that stimulation will soon be considered to be a normal exploitation technique to be mastered with the help of latex diagnosis.

Annex

Situation of the plantations


LỘC NINH
BÌNH LONG
PHƯỚC LONG
Phú Riềng
ĐỒNG PHÚ
TÂN BIÊN
TÂY NINH
DẦU TIẾNG
RRIV LAIKE
PHƯỚC HOÀ
SÔNG BÉ
ĐỒNG NAI
THỦ DẦU MỘT
BIÊN HOÀ
TP HỒ CHÍ MINH
CHƠN THÀNH
TÂN PHÚ
ĐỨC LINH
TÁNH LINH
XUÂN LỘC
BÁO LỘC
CÁT TIÊN
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BÙ NHO
BÙ NA
QUẢN LỢI
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TÂN KHAI
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BÀU LÀNG
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BẾN SỎI
BẾN CÁT
TÂN UYÊN
TRẢNG BÀNG
GÒ DẦU
BẾN CẦU
RUMDUÔN
CHÂU THÀNH
TRÀ BÊC
CHÉO CẠCH
XVAY RIÊNG
PRAY VENG
CON CHÊCH
CÔN CHAI MIA
TÂN PHÚ
KA TUM
KẾT LONG
TÀ TUM
PHU LỐ
LẠC HIẾU
TRÀ THANH
KHE ĐÁ
LỘC THÀNH
BÙ ĐỊP
BÙ XÁ
ĐẮC KIA
PHƯỚC BÌNH
SÓC RÁT
BÙ NHO
TÀ LÀI
RANG RANG
PHƯỚC VĨNH
PHÚ GIÁO
PHƯỚC NGHĨA
VĨNH AN
TÚC TRƯNG
TRỊ AN
GIA KIỆM
THỐNG NHẤT
DẦU GIÂY
ĐỊA RAY
SÔNG DINH
HÀM TH
CỦ CHI
HIỆP HÒA
ĐỨC HUỆ
CHÂM TRÀ
HẬU NGHĨA
MỘC HÓA
ĐỨC HÒA
VĨNH HƯNG
LONG KHỐT
CAI CAI
HỒNG NGỰ
ĐỒNG BẢT CHIÊN
THUẬN AN
ĐỨC MÔN
THỦ ĐỨC
CẨM MỸ
LONG THÀNH
RỪNG LÁ
ĐẤT ĐỎ
PHƯỚC THÁI
LONG HẢI
XUYÊN MỘC
BÌNH GIÃ
BÀU TRÂM
TRẠI BÍ
TÂN THIẾT
CÀ NAM
CÀ VĂN GIÁC
CÀ NAM
MÊ MỘT
ĐẦM RẮN
ĐẦM TÂY
LÀ GÀ
CÀ TRÔT
CHÀ LIÊU
XA ĐẠCH
CHÀ LÀ
BÀU TRÀM
BẾN CÁT
BÌNH LONG
PHƯỚC LONG
SÔNG BÉ
TÂY NINH
BÌNH
ĐỒNG NAI
PRAY VENG
SVAY RIÊNG
TAKÉO
KAMPONG CHAM
KAMPONG THOM
KRATIE
BUÔN B'SOR
DUNG
PHY DUNG
ĐẮK NÔNG
GIA NGHĨA
BÌNH PHƯỚC
ĐỒNG NAI
BÌNH DƯƠNG
TÂY NINH
LONG AN
TIỀN GIANG
BÌNH THUẬN
LÂM ĐỒNG
ĐẮK LẮK
ĐẮK NÔNG
CAMBODIA

Annex

Plantation mission notes

Dong Nai
Laikhe
Dau Tieng
Dong Phu
Binh Long
Ba Ria
Tay Ninh
Loc Ninh
Tan Bien
Phuoc Hoa
Phu Rieng

Dong Nai

Dong Nai *

Date : 1 August 1995

Welcoming personages :

MM. Nguyen Tuan Hung	Chief of Technical Sevices
Phan Ngoc Tuan	Engineer
Nguyen Van Minh	Chief of Accounting and Financial Services
Tran Van Khiem	Assistant Director of the Company.

Glyphosate :

The orders were small (1994 : 900 l -1995 : 900 l, against 24 000 l) and there was not old stock, because it is the first time that they try this treatment by hand; it must be 10 times more to cover all the requirements (there are 13 plantations in this group that occupies more than 40 000 ha). All the orders placed were delivered.

It is a fact that there is some imperata, which is not a crucial problem for the Direction , Nevertheless, one must place a larger order for 1996, because there are some spots of imperata here and there.

There were 70 individual sprayers distributed on the Dong Nai Group. For the little number utilised (the greatest part is in the ware-house and could be distributed to other plantations), these sprayers work, but particularly if it is a matter of a small imperata (or newly cut down), because with a high imperata, the knapsack (getting pressure manually) works better and cost cheaper (and also is a local product).

A parcel of very young culture, treated with glyphosate, was visited. It is exact that the product kills the imperata. But when it is already there, and not when it appears somewhere after the treatment (it is a systemic one). One must treat again.

Fertilisation : On the contrary, the fertilisers orders were maximum, and there are stocks in hand. The situation at 30 June is :

urea	2367 T (+ stock in haud 482 T)
potash	913 T (+ stock in hand 425 T)
rockphosphate	2331 T (+ stock in hand 712 T)

The part of fertilisers from WB was utilised ; they work to day with the stock in hand.

The WB rule (all spreadings must be limited to young cultures + 1 year) was respected . There are 2 spreadings every year, one at the beginning, the other at the end of the raining season. The dosages pay a great attention to the nature of soils (gray soil, red soil). Every spreading is effected in mixture. Fertilisers are only used for heveas, not for the intercrops (maïs, rice or other crops). The spreads are effected in the very young age on the line, vertically under the crown, though there are or not intrecrops ; as soon as the intercrops are not possible (the hevea crown are more or less formed), the spreading can be made in the interlines.

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* The plantation Group of Dong Nai was divided in two : Dong Nai and Ba Ria.

In the same preceding parcels (cultures about one year old), in condition to scratch a little the soil surface, the fertlisers are visible at the plants foot.

The question is the use of Laikhe Laboratory for ordering fertilisers. It is desirable that the fertilisers recommandation will be, for the futur, linked to analysis of soils (generally speaking) and leaves (from the formation of crown) effected by an specialised organism, certainly Laikhe (for the beginning). A meeting was organised last month at Don Nai to examine the question with the two parties (institute - planters). In a first step, one can at the least -because there are two types of soil (red soil and gray soil) and 3 main clones (GT 1, RRIM 600 and PB 235) in the young cultures- ask Laikhe to control and somewhat adjust the fertiliser requirements. Afterward, it would be necessary to put in place, on the plantation, laboratories for the analysis (more or less connected for the circumstance). For exemple, the Dong Nai / Ba Ria has a sufficient dimension to justify the creation of a laboratory for the analysis requirement of soil and leaves. But for those questions, there are previously many training problem to be settled.

Fungicides :

Corticium salmonicolor :

There is a lot of Pink disease in Dong Nai. For Bordeaux mixture, there was a small order for 4 T of $CuSO_4$, but no lime. To day they prefer validamycine, of which 1800 l (1994) were delivered from Chinese source, and 6000 l (1995) ordered to Japan (better quality). The application of the treatment is effected without scraching, which simplifies considerably the work, and directly with a pole from the ground. The new cases observed are treated with a product coming from China, as for the treatment of old trees affected by the disease, the Japonese product, more efficient, would be used. The treatment with validamycine is easy and economical. The choice is resolutely made in favour of validamycine.

Phytophtora palmivora :

Care and treatment to tapping panel.
The conversion to Ridomil (allowed product, made with metalaxyl-mancozeb) is on the way. There were important orders : the 1994 one (3970 kg) was delivered and are used now (the treatment is made in the raining season), and the 5 000 kg ordered for 1995 has not yet come. One parcel treated at Ong Que was visited, we could not see the result of the treatment because there was no coloring matter introduced in the product.

Stimulation :

Tapping system (including stimulation)

Apparenly, the general rule of utilisation is to begin the stimulation from the 6th year of tapping, say 12 or 13 years old (opening of the tapping at 6 or 7 years), with the following concentrations in stimulant:

-from 6 to 10 years of tapping : 1,25 %
-at 11 years of tapping and beyond : 2,50 %

There are 4 stimulations in a year, only in raining season ; there is no différence according to clones (nevertheless, PB 235 is physiologically in the very opposite of GT 1).

The tapping system is S/2 D/3 D/4, which represents half the intensity used in the past (S D/3 D/4 + stimulation)) where GT 1 constituted an important part of the area planted in hevea, exatly what is now. So, one can stimulate, and even more : one must stimulate.
For PB 235, which is tapped for many years already, it is the first time it was stimulated. Some carefulness is indidpensable.

The results of the stimulation are good nowadays, particularly with the Rhone-Poulenc product that is more efficient than the Russian one used in the past.

The D.L. (latex diagnosis).

The integration of all data gives an increase of yield which is observed on the field. A méthod, by the analysis of a certain number (4) of latex parameters of a sample of trees from a parcel, allows to optimize the tapping (too strong or too feeble, the tapping leads to a loss of productivity). Laikhe, that had some chemical research worked trained to this method, would be obviously suitable :

- for animating a D.L. Laboratory (including contract). It is thought that a laboratory can "treat" 40 000 ha of clone culture in tapping,
- and according to the requirements (there are 160 000 ha belonging to GRC), it is necessary to set up additional laboratories, to begin by Dong Nai where there was once a laboratory for analysis

The tapping / stimulation / D.L. is a discipline that must be studied altogether in a block.

Laikhe

Laikhe

Date : 3 August 1995

Welcoming personages :

Mrs. Tran Thi Thuy Hoa	Deputy Director, IRCV Coordinator of WB Project.
MM. Nguyen Hai Duong	Head of Crop Protection Division
Nguyen Van Duc	Joint Head of Soil - Agrochemistry Division.
Dinh Xuan Trung	Head of Physiology-Exploitation Division
Nguyen Nang	Research Officer of Physiology-Exploitation Division.

The Institute holds an important place in the WB project :

-on one part, it is the matter of new techniques (to be developped in and by the project) that IRCV knows already more or less for having experimentated them, or to be perfected by an international aid, sending abroad its cadres for training, or by receivieng foreign experts ;
-on the other part, IRCV has a part in the transfer of these technologies to the national planters, via seminaries and demonstrations to be conducted on the Station or in the plantations.

Orders :

- IRCV has received the major part of the equipments (specially for the orders at 1 000 US $ and more) : the Atomic absorption apparatus (40 000 US $ and not 25 000 US $), the rotary microtome, the air conditionning plants at 1,5 HP, the five motorcycles and the cars, 1 computer/printer, 1 photocopier and the almost totality of small laboratory equipments .
On the other hand, the spectrophotometer, the autoclave, the knapsacks, the "big sprayer" and the computers with their printers (expected to come soon) are lacking, whereas a "laminar flow wood" was not ordered (there is already one).

- As for the chemical product, ordered a long time before -and accepted- the one to whom the market has been allotted has withdraw. This conducts the GRC to find these chemical products in "shopping"(with M. Boyer endorsement). For the minimum requirements, it is CIRAD that has supplied the products : Ridomil, Glyphosate, Validamycine, ...

- The order situation brought up to date is annexed.

The trials of IRCV connected to the WB project are :

- made at Laikhé :
  . imperata control (glyphosate), on the way. It is a very promossing trial.
  . the fertilisers have not been effected for lack of chemical products.

- made in plantation (by IRCV)
  .Dong Phu : stimulation on 2 clones : GT 1 and RRIM 600
  .Dong Nai : use of glyphosate for the controle of imperata (last year).
  .Binh Long : treatment of Corticium salmonicolor by validamycine (conclusion in September).

There were also other trials with these products, but not connected with WB.

The laboratories at the service of the plantation :

- Physiologie laboratory/D.L. : there are few requests from the planters ; this year 500 analysis. That is all right for the laboratory of Laikhé lacks of staff to do more ; they are training abroad. The capacity is now about 1 000 analysis a year : it is the everlasting problem of training. There are many candidates, but once the training is made, the persons concerned go elsewhere (in the private sector) where they are better paid. IRCV could at least demand, as it is done in other countries, a minimum of 10 years to serve the nation.
In fact, there is not only lack of staff, but there are also failures of water, of electricity, ...
It is the Laikhe staff who goes to the plantations for taking samples. The analysis would be charged 5 US$ (from which 2 US$ for the laboratory part). But if one counts the expenses for the journey there and back, it would be at least 8 to 10 US$ charged for every analysis.

With the capacity of 1 000 analysis a year, and 4 samples for 100 ha, this laboratory can serve only 25 000 ha of tapped cultures (all services for IRCV excluded, for its own experimental trials that are very numerous). But the areas are planted in large blocs with essentially 3 clones : GT 1, RRIM 600 and PB 235, sometime in red soil, sometime in gray soil. And the areas is very flat. Perhaps, one could reduce the number of samples to be draw for 100 ha (it is a question to be debated). In any way, it would be necessary to increase the capacity of the laboratory who produce D.L. analysis. There is no lack of sites for setting up additional laboratories, and that would be the occasion for the laboratories to be closer to the fields . There is a new task for Laikhe : training future cadres and laborantins for the D.L. technique for the requirements of future laboratories.
In any way, there are uncertainties on unit yields obtained.

- The Agrochemistry laboratory to day is 2 000 samples of soil and 1 500 samples for leaves every year (last year there were 700 samples of soil and 150 samples of leaves in a year, essentially coming from Dong Nai, Tay Ninh and Dong Phu. The laboratory is well fit up and it can increase its capacity on the condition that they have additional staff. If Laikhe goes and fetch samples, the price of one soil analysis would be 10 US$, and the price of one leaf analysis 5 US$.

Trainings

- demonstrations and seminaries : WB does not pay the trials but their présentation to planters (printing charges for prospectus, video, ...), when required. There will be in 1995 at Dong Phu a seminary on the control of imperata, and at Binh Long a seminary on the treatment of Pink disease (started in 1994). The two days of seminary will be charged 2613 US$.
In May 1996, there will be another seminary on exploitation and fertilisation.

- short term fellowships : there was nothing in 1994. For the end of 1995, it is necessary to realize the following mission more or less forecasted :

. on phytopathologie : 2 or 3 weeks in Malaysia (among other things for the thesis maintainer coming back at the beginning of September from Malaysia

. on "soils and leaves analysis for reasonable fetilisation" -utilization of the computer- 3 to 4 weeks in India

. on D.L. + tapping system ; 3 to 4 weeks to Cirad-CP and Côte d'Ivoire and, as long as one is there, to realize other missions a little on the fringe of the present problem, but that must interest WB :

-breeding programme : 2 or 3 weeks in Côte d'Ivoire

-transfer of technology (smallholders) : in Thaïlande or Indonesia (Sembawa): a new researcher is forcasted for Laikhe for studying the question (especially for the Highlands).

- long term fellowships : for question of personal convenience the 2 researchers, forecasted respectively, one for Malaysia, the other for India, were replaced by two researchers for Malaysia (an nobody for India).

Technical assistance :

For assistance in certain domains (Physiology, Agrochemistry ...) 3 or 4 researchers must be proposed and, among them, WB will make its choice. For example, in Physiology, 3 names have been proposed : MM. Jacob (France), Sethuraj (India) and Sivakmaran S/o Seenivasagam (Malaysia). For Agrochemistery, we think to MM. Eschbach, to one from Malaysia and to another one somewhere else.

✓ : ordered, not received yet
× : received

siology & Exploitation (priority sector)

		1994 Q	Unit cost	Price	
			← US $ →		
quipment					
1- Lab. equipment					
-	-	-	-	-	
- Other apparatus					
. Micro computer AT 80486 DX50		1	1500	1500	✓
. Printer Laser color		1	1200	1200	
. pH meter portable		2	500	1000	×
. pH meter desk		1	500	500	×
. Electrode for portable pH meter		2	100	200	×
. Electrode for desk pH meter		2	100	200	×
. Test tubes plastic 13x120 m/m 5000/bag	(bag)	10	350	3500	×
. Ink ribbons for spectro-print	(box)	10	13	130	✓
				8230	
- Other equipment					
. Generator 1,7 KW		1	700	700	×
. Uninterrupted power supply (for micro-computer)		1	300	300	×
. Air conditionners 1,5 HP		2	500	1000	×
. Voltage stabilizer 2 KVA		1	500	500	×
				2500	
- Lab. chemicals	- nil -			-	
2- Agricultural equipment	- nil -			-	
3- Vehicles					
- Motorcycles (100 cc / 70 cc)		2	1000	2000	×
- Automobiles (4500 cc, 9 seaters, petrol)		1	30000	30000	×
B. Materials for experimentation					
1- Fertilizers	- nil -			-	
2- Chemicals					
- Trichloroacetic acid	(Kg)	8	50	400	✓
- Iron sulfate	"	3	20	60	✓
- Etephon (2-chloro ethyl phosphonic acid	"	266.7	15	4000	✓
- Buffer titrisol pH 7.00	(tube)	5	16	80	✓
- " pH 5.00	"	5	16	80	✓
				4620	

;iology & Exploitation (cont.)

	1994		
	Q	Unit cost	Price
		US $	
raining			
1- Demonstrations & Seminars			
. Stimulation tests on two clones : GT 1 and RRIM 600. Area needed : 24 ha / 2 trials (Dong Phu Company, grey soil)			4000
2- Short term fellowship			
. Modern rubber tapping systems (Cirad-CP) 10 days			6000
3- Overseas masters			
. Physiology & Exploitation ; RRII (3 years) . For 1994 :			10000
Technical Assistance - nil -			-
Documentation - nil -			-
Total Physiology & Exploitation 1994			67 350

siology & Exploitation (priority sector)

			1995 Q	Unit cost	Price	
				← US $ →		
Equipment						
1- Lab. equipment						
-	- nil -				-	
- Other Apparatus						
. Spectrophotometer, printer, auto cell unit			1	8000	8000	✓
. Agitator TOP MIX			2	200	400	✗
. Vacuum cleaner			1	130	130	✗
. Beaker	1000 mL		5	14	70	✗
. "	500 "		10	5	50	✗
. "	250 "		15	4	60	✗
. "	100 "		10	3	30	✗
. "	5 " 10mL		10	2	20	✗
. Pissettes	250 mL (4/bag)	(bag)	2	6	12	✗
. "	500 "		4	7	28	✗
. Fiole Vitro 800	12 mL (144/bag)	"	6	100	600	
					9400	
- Other equipment	- nil -				-	
- Lab. chemicals	- nil -				-	
2 -Agricultural equipment	- nil -				-	
3 -Vehicles						
- Motorcycles	- nil -				-	
- Automobiles	- nil -				-	
Materials for experimentation						
1. Fertilizers	- nil -				-	
2. Chemicals						
. Trichloro acetic acid		(Kg)	8	50	400	✓
. Iron Sulfate		"	3	20	60	✓
. Etephon (2-chloro ethyl phosphonic acid)		"	100	15	1500	✓
. Buffer titrisol	pH 7.00	(tube)	5	16	80	✓
"	pH 5.00	"	5	16	80	✓
					2120	

Training .../...

ysiology & Exploitation (cont.)

	1995		
	Q.	Unit cost	Price
		← US $ —	
Training			
1. Demonstration & Seminars			
. Stimulation test on two clones : GT 1 and RRIM 600; continuation of the 2 trials (24 ha) started in 1994			4000
2. Short term fellowship			
. D.L technics (Cirad-CP) 10 days.			6000
3. Overseas masters			
. Physiology & Exploitation - RRII (1995 : second year)			10000
Technical Assistance			
. Physiology / Exploitation ; practice of the DL (Cirad-CP)			6500
Documentation - nil -			-
Total Physiology & Exploitation 1995.....			38 020

ɜro-chemistry

	1994			
	Q	Unit cost	Price	
		←	US $ →	
. Equipment				
1- Lab. equipment				
- Atomic absorption apparatus	1	25 000	25 000	X
- Other apparatus				
. Magnetic shaker and magnetic stirring	2	157.5	315	X
. Vacuum Pump (air/gas) 14 L/mn (boxe)	1	320	320	X
. Filt. pap. (rapid) 0 90 m/m (100 pcs/box)	100	2.6	260	X
. " 0 110 m/m (")	50	3.6	180	X
. Filt. pap. (mi-rapid) 0 110 m/m (")	25	3.6	90	X
. Volumetric flask 25 mL	50	5.5	275	X
. Pipettor 0 5 - 25 m/m	2	12	24	1
. Tubing for gas (butyl) (m)	10	2.5	25	6
. Pipette Robinson - Kohn 10 mL	2	58.5	117	0
. Tongs crucible 400 m/m	3	6.9	20.7	X
. " 300 "	2	10;7	21.4	0
. Vacuum cleaner	1	130	130	0
. Automatic burette pellet 10 mL	2	80	160	X
. " 25	2	80	160	0
. " 50	2	80	160	X
. + accessories flask of 2000 mL white glass	2	17.8	35.6	X
" " brown glass	2	19;6	39.2	X
. Rubber bulb, tube 20 cm	2	7.3	14.6	X
. Micro burette Telfon key 2 mL	2	58.3	116.6	X
. " 5	2	60.2	120.4	X
. " 10	2	100	200	X
. Micro computer PC/AT 486, cache Memory 101 keys Keyboard.... + printer 24 pins	1	1640	1640	/
			4424.5	
- Other equipments				
. Cables and connectors			500	/

- Lab. chemicals .../...

·o-chemistry (cont.)

Equipment (id)

1- Lab. equipment (id)

		1994		
		Q.	Unit cost	Price
			←	US $ →
- Lab. chemicals				
. Sulfuric acid 98 - 100 %	(L)	60	8	480
. Hydrochloric acid 37 - 39 %	(L)	10	7.28	72.8
. Orthophosphonic acid 90 %	(Kg)	10	41	410
. Boric acid 99.5 %	(Kg)	5	20.5	102.5
. Perchloric acid 70 %	(L)	5	45.56	227.8
. Salicylic acid 99 %	(Kg)	3	21.4	64.2
. Nitric acid 69 - 71 %	(L)	5	16.2	81
. Ammonium acetate 98 %	(Kg)	6	25.1	150.6
. Potassium dicromate 99.5 %	(Kg)	2	37.4	74.8
. Acetic acid 99.8 %	(L)	2	23.4	46.8
. Mercury (II) sulfate 97 %	(Kg)	2	62.64	125.2
. Selenium	(bottle)	2	34.5	69
. Strontium chloride	(Kg)	1	49	49
. Triethanolamine 98 %	(L)	0.5	28	14
. Murexide	(g)	20	2.62	52.4
. Aluminium 99 %	(Kg)	0.25	99.6	24.9
. Iron 98 %	(Kg)	0.5	15.9	7.95
. Methyl violet	(bottle)	1	32.4	32.4
. Ethylene diamine tetracetique	"	4	15	60
. Buffer solution pH 4.00	(tube)	6	16	96
. " " 7.00	"	6	17.4	104.4
				2345.75

2 - Agricultural equipment

. Fertilizer mixer		1	1000	1000
. Diesel tiller		1	1500	1500
				2500

3 -Vehicles

. Motorcycles	- nil-			-
. Automobiles	- nil-			-

8. Materials for Experimentation .../...

ro-chemistry (cont.)

			1994		
			Q	Unit cost	Price
				US $	
Materials for Experimentation					
1. Fertilizers					
Urea	(T)		7	146	1022
Super P	"		6.5	166	1079
Potash	"		5	65.5	327.5
Dolmomit	"		1	71.5	71.5
					2500
2. Chemicals					
Sulfuric acid	98 %	(L)	300	8	2400
Hydrochloric acid	37 %	"	20	7.28	145.6
Orthophosphoric acid	90 %	(Kg)	25	41	1025
Boric acid	99.5 %	"	10	20.5	205
Perchloric acid	70 %	(L)	10	55.4	554
Salycilic acid	99 %	(Kg)	5	21.4	107
Nitric acid	71 %	(L)	4	16.2	64.8
Potassium dicromate	99.5 %	(Kg)	3	37.4	112.2
Selenium		"	1	34.4	34.4
					4648
C. Training					
1- Demonstrations & seminars					
. Fertilisation according to nutritional diagnostic. Are needed : 8 - 10 ha grey soil (Phuoc Hoa); 8 - 10 ha red soil (Dong Phu)					4000
2- Short term fellowship					
. nutritional diagnostic, fertilizer recommandation Indonesia / Malaysia. Total 15 days					4000
3- Overseas masters					
. Rubber soil ; RRIM (3 years) . For 1994 :					10000 (annulé)
D. Technical Assistance					
- Fertilization according to nutritional diagnostic RRIM (2 weeks)					6500
E. Documentation - nil -					-
Total Agro-chemistry 1994					65 918.25

,gro-chemistry

	1995			
	Q	Unit cost	Price	
		---	US $ ---	
A. Equipment				
1- Lab. equipment				
- - nil -	-		-	
- Other apparatus				
.Water bath 25 - 100 ° 12 L	1	825	825	X
. Standard soil color chart	1	114.6	114.6	X
. Dessicator 0 300 m/m	2	605	1210	X
. Sample tubes capacity 10 mL 0 18 H 62 (box)	10	18.1	181	X
. " 25 mL 0 25 H 50 "	10	31.4	314	X
. Test tubes 0 16 H 160 "	2	35	70	X
. " 0 1[illegible] H 180 "	2	28.5	57	X
. Chemical trolley for laboratory 90x70x50	2	431.4	862.8	O
. Macro pipetter green 1 - 5 mL	2	204.3	408.6	X
. " white 2 - 10 mL	2	204.3	408.6	X
. " yellow 0.4 - 2 mL	2	204.3	408.6	O
. + accessories (mouth) 1 - 5 mL (box)	2	43.8	87.6	X
. " 2 -10 mL "	2	49.1	98.2	X
. " 0.4 - 2 mL "	2	33.3	66.6	O
. Sieve inox 0.25 0 100 m/m H 45 m/m	4	61.7	246.8	X
. " 0.50 " "	4	61.7	246.8	X
. Cover of sieve inox 0 100 m/m	2	29.7	59.4	X
. Bottom " "	2	29.7	59.4	X
. Drying oven 150 L (40 - 300°)	1	3597	3597	X
. Small glass ball 0 4 m/m (Kg)	2	22	44	X
. " 0 6 m/m "	2	22	44	X
. Filter paper (rapid) 0 90 (box)	100	2.6	260	X
. Kjeldahl nitrogen digesting appar. (100 mL-6 pcs)	1	130	130	X

			9800	
- Other equipment				
. -nil-			-	

- Lab. chemicals .../...

Agro-chemistry (cont.)

		1995			
		Q.	Unit cost	Price	
			→	US $ →	
A. Equipment (id)					
1- Lab. equipment (id)					
- Lab. chemicals .					
. Sulfuric acid 98 - 100 %	(L)	60	8	480	✓
. Hydrochloric acid 37 - 39 %	(L)	10	7.28	72.8	✓
. Orthophosphonic acid 90 %	(Kg)	10	41	410	✓
. Boric acid 99.5 %	(Kg)	5	20.5	102.5	✓
. Perchloric acid 70 %	(L)	5	45.56	227.8	✓
. Salicylic acid 99 %	(Kg)	3	21.4	64.2	✓
. Nitric acid 69 - 71 %	(L)	6	16.2	97.2	✓
. Ammonium acetate 98 %	(Kg)	6	25.1	150.6	✓
. Potassium dicromate 99.5 %	(Kg)	2	37.4	74.8	✓
. Acetic acid 99.8 %	(L)	3	23.4	70.2	✓
. Mercury (II) sulfate 97 %	(Kg)	2	62.64	125.2	✓
. Selenium	(bottle)	2	34.5	69	✓
. Strontium chloride	(Kg)	1	49	49	✓
. Buffer solution pH 4.00	(tube)	6	16	96	✓
. " pH 7.00	"	6	17.4	104.4	✓
. Sodium hydroxide 97 %	(Kg)	12	42.1	505.2	✓
. Magnesium oxide 96 %	"	1	215.5	215.5	✓
. Glycerol 98 %	(L)	2	27.1	54.2	✓
. Aceton 99 %	"	2	9.6	19.2	✓
. Hydrogen peroxide 30 %	"	2	6.1	12.2	✓
				3000	
2 - Agricultural Equipment					
. - nil -				-	
3 - Vehicles					
. Motorcycles		1	2000	2000	✗
. Automobiles		1	30000	30000	✗
B. Materials for Experimentation					
1. *Fertilizers*					
. Urea	(T)	11	146	1606	✓
. Super P	"	10.5	166	1743	✓
. Potash	"	7	65.5	458.5	✓
. Dolomit	"	2.7	71.5	192.5	✓
				4000	

gro-chemistry (cont.)

		1995			
		Q.	Unit cost	Price	
			←	US $ →	
Materials for Experimentation (id)					
2. Chemicals					
. Sulfuric acid 98 - 100 %	(L)	300	8	2400	✓
. Hydrochloric acid 37 - 39 %	(L)	20	7.28	145.6	✓
. Orthophosphonic acid 90 %	(Kg)	50	41	2050	✓
. Boric acid 99.5 %	(Kg)	10	20.5	205	✓
. Perchloric acid 70 %	(L)	10	55.4	554	✓
. Salicylic acid 99 %	(Kg)	5	21.4	107	✓
. Nitric acid 69 - 71 %	(L)	4	16.2	64.8	✓
. Potassium dicromate 99.5 %	(Kg)	4	37.4	149.6	✓
. Selenium	"	1	34.5	34.5	✓
. Strontium chloride	"	3	49	147	✓
. Sodium metaphosphate	"	2	20.1	40.2	✓
. Benzenz	(L)	1	17.8	17.8	✓
. Ascorbic acid	(bottle)	1	53.5	53.5	✓
. Sodium thiosulfate	(Kg)	2	15.5	31	✓
				6000	
Training					
1- Demonstrations & Seminars					
. Fertilisation according to nutritional diagnostic. Are needed : 8 - 10 ha grey soil (Phuoc Hoa); 8 - 10 ha red soil (Dong Phu)				4000	O
2- Short term fellowship					
. nutritional diagnostics : applied informatics				4000	✓
3- Overseas masters					
. Rubber soil - RRIM (1995 : second year)				10000	X
Technical Assistance	- nil -			-	
Documentation	- nil -			-	
				72 800	

Total Agro-chemistry 1995. .....

Crop - Protection

		1994			
		Q.	Unit cost	Price	
			← US $ →		
A. Equipment					
1- Lab. equipment					
-		-	-	-	
- Other apparatus					
. Autoclave 120 L		1	2000	2000	✓
-. Other equipment					
. Air condionner 1,5 HP		1	500	500	✗
. Lab. chemicals	- nil -			-	
2- Agricultural equipment					
. Knapsack-Hand Sprayer (liquid material) Max. pressure 7.0 Kg/cm2		10	150	1500	✓
. Knapsack (liquid, granule, dust) Air flow rate 9 m3/min		4	500	2000	✓
				3500	
3- Vehicles					
. Motorcycles		1	2000	2000	✗
. Automobiles	- nil -			-	
B. Materials for Experimentation					
1- Fertilizers	- nil -			-	
2- Chemicals					
. (Ridomil L50) Metalaxyl (8 %) + mancozeb (64 %)	(Kg)	150	8	1200	✓
. (Sandofan CM) Copper mancozeb	"	9.37	8	75	✓
. Validamycine A 5L	(L)	200	5	1000	✓
. Tilt 250 EC	"	10	16	160	✓
. glyphosate (isopropylamine salt) 48 %	(Kg)	240	7.5	1800	✓
. sulfosate (trimethyl sulfonium salt) 48 %	"	200	9	1800	✓
				6035	

C. Training

..../....

Crop - Protection (cont.)

	Q	Unit cost	1994 Price
			US $
C. Training (id)			
1- Demonstration & Seminars			
. Imperata cylindrica treatment by glyphosate needed : 10 ha of immature culture			1500
. Pink disease treatment by validamycine needed : 10 ha of immature/mature culture			1500
			3000
2- Short term fellowship - nil -			-
3- Overseas Masters - nil -			-
D. Technical Assistance - nil -			-
E. Documentation - nil -			-
Total Crop - Protection 1994			17 535

Crop - Protection

			1995			
			Q	Unit cost	Price	
				← US $ →		
A. Equipment						
1- Lab. equipment						
-	-		-	-	-	
- Other apparatus						
. Rotary microtome			1	2000	2000	X
. Laminar flow hood			1	4500	4500	O
					6500	
- Other equipment	-				-	
- Lab. Chemicals						
. Acetic acid	99,8 %	(L)	5	23.4	117	✓
. Sulfuric acid	98 %	"	5	8	40	✓
. Canada Balsam		(g)	200	0.29	58	✓
. Formaldehyde	37 %	(L)	4	25	100	✓
. Lactic acid	90 %	"	2	24	48	✓
. Amann's Lactophenol	25 : 50 : 25	(bottle 0.5 L)	4	17.35	69.4	✓
. Paraffin oil	0.1 N/100 g	(L)	2	15.8	31.6	✓
. m-Xylene	d: 0.86	"	1	17.5	17.5	✓
. Gentian violet (for bacteriology)		(g)	100	0.43	43	✓
. Fuschin, basis	"	"	100	0.45	45	✓
. Phenol		(Kg)	1	78.4	78.4	✓
. Palm oil	d: 0;92	(L)	40	15.35	614	✓
. Congo red		(g)	100	0.316	31.6	✓
. Thymol blue		(bottle 250 mL)	1	35	35	✓
. Vaseline		(Kg)	50	13.43	671.5	✓
					2000	
2- Agricultural Equipment						
. Big sprayer drawn by tractor			1	3750	3750	✓
3- Vehicles						
. Motorcycles			1	2000	2000	X
. Automobiles	- nil -				-	

B. Materials for experimentation .../...

Crop - Protection (cont.)

		1995 Q	Unit cost	Price
			US $	
B. Materiel for experimentation				
1 - Fertilizers - nil -				-
2 - Chemicals				
. (Ridomil L50) Metalaxyl (8 %) + mancozeb (64 %)	(Kg)	300	8	2400
. (Sandofan CM) Copper ma,cozeb	"	10	8	80
. Validamycine A 5L	(L)	400	5	2000
. Tilt 250 EC	"	10	16	160
. Anvil 53 C	"	10	16	160
. glyphosate (isopropylamine salt) 48 %	(Kg)	400	7.5	3000
. sulfosate (trimethyl sulfonium salt) 48 %	"	200	9	1800
				9600
C. Training				
1 - Demonstrations & Seminars				
. Imperata cylindrica treatment by glyphosate (cont.) on 10 ha of immature culture				1500
. Pink disease treatment by validomycine (cont.) on 10 ha of immature/mature culture				1500
				3000
2- Short term fellowship				
. Study tour in Indonesia about crop protection in plantation (15 days)				3000
. Attending International Conférence TPD in China				3000
				6000
3 - Overseas Masters - nil -				-
D. Technical Assistance - nil -				-
E. Documentation - nil -				-
Total Crop Protection 1995.....				32 850

"Other"	1994			
	Q.	Unit cost	Price	
		← US $ →		
A. Equipment				
1- Lab. equipment				
- - -	-	-	-	
- Other apparatus (for R.D. management)				
. Micro computer PC/AT 486 ...+ Laser printer	1	3500	3500	X
- Other equipment (for R.D. management)				
. Photocopy machine	1	2500	2500	X
2 - Agricultural equipment				
- Breeding Division : Micro Computer (gene bank manag.)	1	1000	1000	✓
3 - Vehicles - nil -			-	
B. Materials for Experimentation				
1- Fertilizers - nil -			-	
2- Chemicals - nil -			-	
C. Training				
1- Demonstrations & Seminars				
- 1994 international IRRDB meeting			4000	O
2- Short term fellowship - nil -			-	
3- Overseas Masters - nil -			-	
D. Technical Assistance				
- to monitor the efficiency of the technical coopération between RRIV and Companies (about 10 days).			6500	O
E. Documentation				
. various books and documents on Rubber from IRRDB Institutes : RRIM, RRII, Cirad-CP, etc...				
. bulletin, Video-tapes, ...				
. English - French - Vietnamese dictionnary.			2700	X
Total "Other" 1994.....			20 200	

"Other"

	1995		
	Q	Unit cost	Price
		← US $ →	
A. Equipment			
1- Lab. equipment			
- -	-	-	-
- Other apparatus - nil -			-
- Other equipment - nil -			-
2 - Agricultural equipment			
- Breeding Division : anemometer, portable wind system	1	1000	1000 /
3 - Vehicles - nil -			-
B. Materials for Experimentation			
1- Fertilizers - nil -			-
2 - Chemicals - nil -			-
C. Training			
1 - Demonstrations & Seminars			
. 1995 international IRRDB meeting			6000 /
2 - Short term fellowshup - nil -			-
3 - Overseas Masters - nil -			-
D. Technical Assistance			
- to monitor the efficiency of the technical cooperation between RRIV and Companies (about 10 days)			8000 0
E. Documentation			
- new books and documents on Rubber (plantation and processing) from the IRRDB Institutes			2500 /
Total "Other" 1995			17 500

Dau Tieng

Dau Tieng

Date : 8 August 1995

Welcoming personages :

MM.	Le Van Khoa	Vice Director of the Company
	Lanh Thuy Mong	Head of Account Department
	Huynh Manh Tuan	Head of Technical Department
	Nguyen Ngoc Sieng	Deputy Head of Technical Department
	Nguyen Van Tai	Head of planning Department

Glyphosate :

There is a lot of imperata in the plantation. This is to be compared with the small request for glyphosate addressed to WB.

The orders were small but they are increasing, showing a growing interest with the time :1994 : 6 000 l and 1995 : 10 000 l. For the campaign 1994 / 1995, 705 l are consumed. Now (in August 1995) the 1994 glyphosate stock is pratically consumed (5 000 l). The 1995 glyphosate is not yet received.

No individual sprayer was requested, but the Company got them by its own means (30 CDA) which work well (formerly, Dalapon was used by means of a sprayer getting pressure manually). The consumption of glyphosate is 6 l / ha for the treatment of interligne, and 4 l / ha for the treatment on the lines.

In 1996, there will be surely much more glyphosate to order. 5 years are necessary to attain the cruising regime.

On the visited parcels, the treatment result is spectacular, on the lines as well as between the lines. The Company has resolutely changed its policy for the fight against imperata by glyphosate.

Fertilisation :

They use a great amount of fertilisers (it is easily understandable because all the area is in gray soil, and not allways of the best quality).

Orders :	1994	1995
urea	1796 T	1672 T
potash	552	429
rockphosphate	1841	1666

From the end of 1994, are consumed : urea 832 T - potash : 343 T - rockphosphate : 674 T. To day, all the 1994 portion was consumed. In 1995, urea and rockphosphate are nor received. For potash, 429 T are used. The 1996 requirements are not estimated.

The WB fertilisers are only used for immature cultures + 1 year (because there are fertilisers from other sources for the mature cultures).There is a particular fertiliser formula for every age of culture (cf. appendix 1). The fertilisers are applied in group , 2 times a year, at the beginning and at the end of the raining season.

The anterior recommandations were made without soils and leaves analysis. From now, following a meeting with IRCV, they will be based on soils and leaves analysis effected by the Laikhe laboratory. The sampling are made by Laikhe team.

As for the fertilisers application -one specimen has been seen- it is effected in a small pit along the line, but transversally between the trees (it was a very young culture).

Fungicides :

Corticium salmonicolor :

There is some reticence for the planters to change their habits : replacing Bordeaux mixture by validamycine.
In a first step, one can expect to adopt a system based on :

- the resort to Bordeaux mixture applied to immature culture, (there is no risk of toxicity because there is no latex extraded)
- the resort of validamycine applied to mature culture (the product has no toxicity on the latex).

Little by little, new habits will be taken (there in no scratching to do with validamycine).

From 3 000 l ordered in 1994, there are 2 100 l consumed to day. The 2 000 i ordered in 1995 are not delivered. The 1996 order is not studied yet.

There are in the market two products, a Japanese one and a chinese one. The Japanese product is more expensive. They choose the Chinese product (joint venture in Vietnam for a validamyine factory).

Phytophtora palmivora :

They are no more "black stripes" on the plantation : wether the treatments were made regularly, or there is no more phytophtora palmivora . There was no problem for the replacement of Difolatan (prohibited to day) by Ridomil (allowed).

Remarks on the use of fungicides : neither for Corticium salmonicolor (validamycine) nor for Phytophtora palmivora (Ridomil), there is no coloring matter introduced in the products, susceptible to make visible the treatment. It seems evident for the manager of the plantation that, once an order is given, it is executed and the work is done. One thinking over, the thing is quite possible because the plantation seems all right. In any case, if the work is not done, one would see the Corticium and the Phytophtora ; now the crowns are healthy ant the panels intact.

Stimulation :

Tapping system (including stimulation)

The type of tapping is the same everywhere : S/2 D/3 D/4 (S/2 D/3 D/3 at the end of the year); in comparison with the past, it is a reduction of the half of the tapping intensity.
Very few blocks were stimulated for lack of stimulant ; there was no order in 1994 and the 1995 order (5 000 l) is not delivered.

On the experimental plan, the stimulation is tried at 1,25 % from the 4th year of tapping on GT 1 and RRIM 600 (no stimulation envisaged for the moment for PB 235).

Afterwards : one increase little by little the concentration. The stimulating product in the future delivered by Rhone-Poulenc, is more efficient than the Russian one.

We have seen a parcel in tapping : impeccable panel. There has been a meeting on stimulation at GRC.

The D.L.

There is a training work to organize in this domain apparently new, but it is a domain that interests the planters. The Laboratory of Laikhe can work on the D.L. in the plantation Group of Dau Tieng. But one could also envisage a collaboration with the neighbouring plantation to set up a laboratory belonging to Dau Tieng and its environment which is typical enough (40 000 ha of trees in tapping). It is a question of training work.

DIỆN TÍCH VƯỜN CÂY HIỆN NAY

LOẠI VƯỜN CÂY		DIỆN TÍCH (ha)	GHI CHÚ
KINH DOANH		**23220.90**	
	TÂN THU	554.00	
	NHÓM I	22666.90	
KTCB		**5748.69**	diện tích kéo dài
ĐỨNG	TUỔI (st 89 về sau)	3421.94	sẽ mở cao 1000 ha
KÉO	DÀI (st 88 về trước)	2326.75	vào tháng 10/1995
TỔNG CỘNG		28969.59	

Vườn cây tân thu

Chế độ cao: S d2 6d/7

Số phần cây: 556

Số công nhân: 278

Sản lượng bình quân: 449.35 kg/ha

Vườn cây nhóm I

Chế độ cao: S/2 d3 6d/7

Số phần cây: 16992

Số công nhân: 5769 / 145 tổ

Sản lượng bình quân: 957.01 kg/ha

CƠ CẤU GIỐNG TRỒNG (ha)

GIỐNG	TỔNG DIỆN TÍCH	1976 - 1994	< 1962	%
PR 107	118.40	118.40		*0.41%*
PB 235	14310.61	14310.61		*49.40%*
VM 515	4063.97	4063.97		*14.03%*
GT 1	5879.06	5879.06		*20.29%*
RRIM 600	2900.13	2900.13		*10.01%*
PR 255	148.10	148.10		*0.51%*
PR 261	610.21	610.21		*2.11%*
POLY	939.10	385.10	554.00	*3.24%*
TỔNG	28969.58	28415.58	554.00	100.00%

ĐỊNH MỨC BÓN PHÂN (kg/ha)

LOẠI VƯỜN CÂY	Uré	Lân	Kali
TRỒNG MỚI	50	80	15
KTCB năm 2	100	165	25
KTCB năm 3	150	225	40
KTCB năm 4	190	265	47
KTCB năm 5	237	313	57
KTCB năm 6	237	313	57
KTCB năm 7	237	313	57
KINH DOANH	175	225	135

Dong Phu

Dong Phu

Date : 10 August 1995

Welcoming personages * :

M. Phan Phi Hieu	: Vice Chairman of Technic Department
Mrs. Houang Thi Hue	: Member of financial Department

Glyphosate

It is used in large quantity on the plantation of the Group (there is a great deal of imperata) ; and the treatments appear to be effective. Formely they used Dalapon.

Orders :	1994	1995
	12 000 l	6 000 l

The total requirements for 1994/1995 -say 12 000 l- were not sufficient and they must borrow 7 000 l from Phu Rieng. On the whole, there were 19000 l that were consumed. The 1995 order was not delivered.

To apply the treatments, the Company that has not ordered sprayers, -nor big appliances (hitched to tractor), nor individuals - have to buy with its own money 50 individual sprayers, reinforced by 12 "big sprayers".

The field treated with glyphosate, along the road sides, have been seen ; some fields were treated on the lines, others between the lines, others on the entire surface. The results are good. It is worthy to note that on some fields, there are some small green plots left : certainly they are recent treatments.

Fertilisation

Orders :	1994	1995
Urea	1129 T	872 T
Potash	215	182
Rockphosphate	1083	846

All fertilisers are consumed in 1994. The 1995 order is not yet delivered (except fot potash).

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* A part of the Authorities is occupied by the visit to Dong Phu factory, effected at he same time by an Australien expert accompagned by the Technology Adviser; in consequence, few responsibles are present here.

The WB prescription (the fertiliser spreading must be limited to immature cultures + 1 year) was respected. But they also spread fertillsers (non WB) on mature cultures.

The WB fertilisers are applied on the line (not on the intercrops that are not much practised), in mixture and 2 times a year : the first application in April / May (at the beginning of the raining season), and the second one in September / October (at the beginning of the second raining season). The fertilisers are spread manually in immature cultures (mechanically or manually in mature cultures)

The fertilisers formulas differ not much one to another, on red soils or on gray soils : a little more fertilisers on gray soil than on red soil.

There was also a trial of fertiliser application in 1991 and 1992 in collaboration with Laikhe, that had made samples of soils and leaves. Last year, new samplings were effected. In fact, the process is not regular; they have to set up an organised system.

Fungicides :

Corticium salmonicolor :

There would be a great number of trees affected by the disease.

Orders : Here, they resolutely give up Bordeaux mixture. There was no order for CuSO4 and for lime. Per contra, they speculate on validamycine. In 1994, the Company has bought on the Vietnamese market the Chinese and Japonese validamycine to study them. In 1995, they ordered 600 l via WB (but not yet delivered) to the Chinese validamycine (almost at half of the Japanese price with an equal value).

For lack of time, it was not possible to go in the blocks to see the affected and treated trees.

Phytophtora palmivora :

There would be a lot of trees the bark of which are affected by this disease.

As the use of Difolatan is prohibited, Ridomil (WB) is the only fungicide used fot the treatment (with succes). In 1994, the 700 l ordered were not sufficient and they must buy on the home market (out of WB). In 1995, the 715 l ordered are not delivered.

For lack of coloring matter introduced in Ridomil to make it visible, it was not possible to see the treated barks. The tapping seems to be good, without any attack of phytophtora.

Stimulation :

Tapping system : (including stimulation) :

The stimulation (Rhone-Poulenc product) is practised every time possible. In 1994, 16 000 l of stimulant were ordered ; they will be widely sufficient for the stimulations in the two years 1994 and 1995. There are in stock 15 000 l for the stimulations in 1995 and perhaps for the 1996 ones (at least partially).

The WB prescription was a little twisted : they stimulate at he beginning of tapping, but with a feeble concentration, roughly 1,5 %. Then, they progressively increase the concentration in active matter. Even PB 235 is stimulated 2 or 3 times a year in these conditions, this process is debatable.

Same remark, as for Ridomil : for lack of coloring matter in the product, there were not any trace of the stimulation on the panel. The visit was not needful and it was not made.

The D.L.

Laikhe takes an interest in this Company, specially open. The research workers of the Laboratory of Physiology have come there to draw sample of latex. It was not possible to know if that was a trial or the beginning of the application of the D.L. method. The sure thing is that Laikhe must put in place a regular and organised method.

NHẬP - XUẤT - TỒN vật TƯ NH TG năm 04 đến tháng 6/195

Tên	ĐVT	Nhập SL	Nhập TT (USD)	Xuất SL	Xuất TT (USD)	Tồn SL	Tồn TT (USD)
ure	Tấn	1129	191 794,52	826	140 320,88	303	51 473,64
kaly	"	397	56 462,7	397	56 462,7	-	-
Rock phot phat	"	1083	54 150	1029,4	51 470	53,6	2 680
petrolatum	"	1,5	1 425	1	-	1,5	1 425
metta man.	Lít	700	4900	430	3 010	270	1890
2 Ther.	"	16000	26.400	709	1 169,85	15291	25 230,15
glypo sat.	"	12000	41 400	11386	39 281,7	614	2 118,3

Binh Long

Binh Long

Date : 12 August 1995

Welcoming personages :

M. Nguyen Thanh Minh	Vice Director of the Company.
Mrs. Pham Thi Tuan	Chief of Agricultural Department

Glyphosate : Apparently there is a great deal of imperata.

Orders :	1994	1995
	1000 l / 32 000 l	1000 l

The 1994 thousand of litres are few in comparison with he requirements. There would be 10 % of the area that must be treated, say some 1500 ha. In fact, it is there a small quantity intended for glyphosate treatment trials, on an area about 200 ha, taken on various plantations of the group (Cf. appendix 1). The trial is conclusive. But the 1995 order, only at the same level of the 1994 one, is still feeble and, in addition, is not delivered. So, the plantation must itself pay out its requirements. That is what the plantation will do on condition that the prices are normal and that there are not long delays of delivery.

3 sprayers CDA were ordered (at WB title) : they were delivered. But they are not sufficient enough to assume the treatment. So, it will be necessary to use sprayers getting pressure manually.

The consumption of glyphosate is from 5 to 6 l / ha.

We have seen the 150 / 200 ha treated with glyphosate. The treatment was efficacious. It is worth to note that there are many intercroppings on the plantation (especially rice). That is to say there is so much less to be treated against imperata.

Fertilisation :

Orders :	1994	1995
Urea	1562 T	1417 T
Potash	408	287
Rockphosphate	1560	1415

The maximum quantity was requested.
The rule is to spread the WB fertilisers only on immature cultures + 1 year. This rule is repected. But, at the same time, fertilisers from other origins are spread on cultures in productivity ; so, the whole plantation is fertilised. The 1995 order has not come. Consequently, there was a great need of fertilisers, and the Direction was obliged to buy fertilisers from other sources (in bulk more than 3000 tonnes).

Red soils (70 % of the area) as well as gray soils recieve fertilisers. Herewith is a table (appendix 2) giving the formulas (GRC procedure) used for various plantations and soils. The fertilisers were spread after the treatment with glyphosate.

The fertilisers are applied in mixture, 2 times a year. A fertiliser spreading scheme was established in collaboration with the Agrochemistry Laboratory of Laikhé (this Laboratory, in the past, has carried out analysis of that type at Binh Long)

Fungicides :

Corticium salmonicolor : There are some.

Orders :	1994	1995
Bordeaux mixture		
Cu SO4	27,5 T	-
Lime	120 T	-
Validamycine	860 l	12 000 l

It is clear that the year 1994 was used as an investigation year for validamycine. This fungicide that has worked well, will replace Bordeaux mixture in 1995. So the Company bought 3000 l of validamycine on the home market and is going to buy 1000 l more. Two products are offered : a Japanese one and a Chinese one. The Japonese product could be more efficient, but the Chinese has gained the market (it is much cheaper).

A visit to the heveas blocks allows us to see the treatments with validamycine on the trees affected by corticium. As a matter of fact, one can see that the tree is no more ill (no corticium visible).
A white mark on the treated trees, for lack of dyes introduced, allows us to detect the touched by the fungicide.

PB 217 would be a clone very sensible to corticium.

Phytoptora palmivora : Ridomil is hereafter in use on the plantation.

The 1994 order (2500 kg) was only delivered at the beginning of 1995; so, it could be used only in the course of the year 1995 (therefore there was no order for this year). We must see the question again for 1996.

A GRC utilisation protocol of a "red soil" water introduced in Ridomil could have the power to color in red the portion of the treated panel. But the plantation has not yet used such a system, so one cannot see the mark of the treatment.

Stimulation :

Tapping system (including stimulation) :

The 1994 order for 27 000 l was delivered in 1994. The 1995 order is yet to be waiting. But the 1994 delivery would be sufficient enough for 1995. It is probably a Rhone-Poulenc product.

There are now about 1000 ha stimulated according to WB norms. The stimulated clones are essentially GT 1 and RRIM 600. PB 235 was not stimulated till now, that is good. The stimulation is applied 3 to 4 times a year.

The incease in yield is about 30 %

The D.L.

The teams of Laikhe had come at Binh Long, 4 years before, to take latex samples and they already gave the results. It would be necessary to renew the contacts and put in psition a steady work on D.L..

CÔNG TY CAO SU BÌNH LONG
PHÒNG K T N N

BÁO CÁO PHÂN BÓN VƯỜN KINH DOANH

ĐỢT 1- NĂM 1995

NÔNG	DIÊN TÍCH			UREA		LÂN		KALY	
TRƯỜNG	D.T BÓN	D.T Q.LÝ	TỸ LỆ%	S.LƯƠNG	TỸ LỆ%	S.LƯƠNG	TỸ LỆ%	S.LƯƠNG	TỸ LỆ%
Trà Thanh	933.20	933.20	100.00	75,970	55.38	87,380	52.02	51,800	49.56
Lợi Hưng	809.19	851.76	95.00	71,197	59.85	87,382	59.99	54,206	59.81
Quản Lợi	999.72	999.72	100.00	103,127	70.17	108,991	60.57	78,541	70.15
Xa Trạch	1,357.22	1,388.49	97.75	120,737	60.52	146,400	59.93	90,311	59.41
Xa Cam	790.97	790.97	100.00	69,600	59.86	77,000	54.08	53,026	59.86
Bình Minh	1,032.91	1,032.91	100.00	108,054	71.16	123,830	66.60	77,656	67.13
Đồng Nơ	1,218.60	1,218.60	100.00	123,200	57.77	124,100	45.26	99,500	60.48
Minh Hưng	1,518.85	1,518.85	100.00	158,130	59.49	204,450	59.83	123,054	60.01
Công Ty	**8,660.66**	**8,734.50**	**99.15**	**830,015**	**65.20**	**959,533**	**61.55**	**628,094**	**64.75**

Phụ ghi : Định mức vườn cây khai thác theo quy trình của TCT

- Đất đỏ ; Ure : 147 kg/ha - lân : 180 kg/ha - kaly : 112 kg/ha

- Đất xám ; Ure : 175 kg/ha - lân : 225 kg/ha - kaly : 135 kg/ha

Data of application glyphosate to control lalang at Binh Long Rubber Company in 1994.

Plantations.	Area applied glyphosate (ha)		Quantity of glyphosate sprayed. (l).	
	Till July -	estimated for Oct.	Till July -	Estimated for Oct.
Xa Cam	154	250	877	—
Xa Thanh	20	35	100	
Quan Loi	08	30	48	
Loi Hung	09,5	20	57	
Minh Hung	06,0	—	30	
Xa trac.				
Binh Minh				
Total	197,5.	305	1112.	

Ba Ria

Ba Ria

Date : 16 August 1995

Welcoming personnages :

MM.	Hoang Trung	Director of the Company
	Huynh Van Bao	Chief accountant

Glyphosate

There is a little of imperata (10 % of the total area, but principally in Hoa Binh plantation).

Orders	1994	1995
	300 l	1000 l

The 300 l ordered in 1994 have been delivered and consumed. The 1995 order is not delivered. So it is necessary to buy the glyphosate on the home market for utilisation during 1995. After that, there will be a shifting of one year, from a year to another one. The requirements amount to about 700 l-800 l every year (for the needing plantation). For 1996, the requirements in glyphosate have not been estimated, but it is certain that here will be a need.

20 sprayers have been received from Dong Nai at the time of scission. There is no "big sprayer".

The glyphosate works well and planters recognise its ability. But, because Hoa Binh plantation is very far, it is not possible to go there and see a plot treated with glyphosate.

Fertilisation :

The Company takes a maximum in consideratation of the criterium prescribed by WB.

Orders :	1994	1995
urea	759	65O
potash	156	111
rockphosphate	704	617

The quantity ordered in 1994 was received and incorporated in the soil. The 1995 quantity ordered is not yet received (except potash). The plantation must buy the fertilisers on the home market (about 2000 T in bulk). For the 1996 order, we shall see that later on.

In principle, the WB prescription for the fertilisation were well respected :

- -all fertilisers are allowed to heveas (no fertilisers for intercroppings)
- -only immature cultures + 1 year are fertilised.

For the other requirements in fertilisers, especially for mature cultures, they must buy them somewhere else. The fertilisation of mature cultures is supposed to stop after 19 years of tapping.

The WB fertiliser formulation changes with the age of the cultures and the nature of soil. There are about 70 % of red soil and 30 % of gray soil (in fact, for a plantation, it is all red soils or all gray soils). Gray soil receive a little more fertiliser. In the first year, in some cases, they give organic matters. A trial with fertilisation with a "biological fertiliser" on 2 ha is carried out on the plantation.

Cf. appendix for having details on the fertilisers dose.

The spreading is made in mixture, two times a year at the end of June and towards 15 September. The two expected tractors have not come.

The fertilisation results are considered as good.

Some days ago, the scientists of Laikhe have come to draw samples. They began by the poorest plantation of Hoa Binh (gray soil). On this occasion, was signed a contract that could be renewed every following year.

Fungicides :

Corticium salmonicolor : There are some

Orders	1994	1995
Bordeaux misture		
CuSO4	1 T	-
Lime	-	-
Validamycine	600 l	600 l

Between the two possible treatments (Bordeux mixture and validamycine), it is clear that the preference goes to validamycine, 600 l of which were consummed in 1994. The 1995 order is not delivered. As for the 1996 order, it is not yet studied.

For lack of coloring matter, we can not distinguich the treated trees. However, we see no more "pink" on the trees.

Phytophtora palmivora

Orders :	1994	1995
Ridomil	1300 kg	700 kg

Ridomil hase replaced difolatan. The 1994 delivered is partially consumed, the rest is in stock. The 1995 order is not delivered. For 1996, the question will be studied.

No coloring matter was introduced in Ridomil : so, we cannot know if the tapping panels were or not treated. In fact, seeing that it is a periodic preventive measure, one can think the treatment was made.

Stimulation :

Tapping system (including stimulation).

Before the coming of WB, the Company has stimulated the trees, in accordance with the clones, the age of the trees and with the season.

With the arrival of WB, the orders are the following :

-1994 : 18 000 l from which the half has been consumed

-1995 : 18 000 l not yet received

-1996 : certainly there will be an order, but it is not yet studied

The Etephon is from Rhone-Poulenc.

For GT 1 and RRIM 600, good results : + 20 to 30 % (strict GRC prescription) :

-from the 6 th year of tapping, it is used a paste with a feeble concentration of stimulating matter and applied 4 or 5 times a year.

-from the 11 th year, it will be several applications of a stimulating product at 2,5 %, then 5 % and at a stronger concentration for finishing.

For PB 235, when a stimulating product is applied to that clone, a great carefulness is requested.

The D.L.

Laikhe is planning to come to Ba Ria to take some latex for sampling. They will be welcome. A contract must be signed.

Formule d'engrais Ba Ria

		Red soil		Grey soil	
1st year	Urea	36 kg/ha	+ 2380 kg/ha organic	50 kg/ha	+ 952 kg/ha organic
	Potash	12		15	
	Rockphosphate	54		80	
2nd year.	Urea	80 kg/ha.		80 kg/ha	(+ the same as for red soil)
	Potash	20		20	
	Rockphosphate	100		100	
3e year	urea	100 kg/ha.		150 kg/ha.	
	Potash	30		40	
	Rockphosphate	170		215	
4e year.	urea	136 kg/ha		190 kg/ha.	
	Potash	38		47	
	Rockphosphate	205		265	
5e year	urea	170 kg/ha.		237 kg/ha	
	Potash	47		57	
	Rockphosphate	256		313	
6 year	urea	170 kg/ha		237 kg/ha.	
	Potash	47		57	
	Rockphosphate	256		313	

Tay Ninh

Tay Ninh

Date : 18 August 1995

Welcoming personages :

MM :Le Van Mumg	Vice-Director
Tran Van Ranh	Vice-Director
Mrs: Vung Thi Rang	Chief Accountant

Glyphosate :

There is imperata at Tay Ninh.

Orders	1994	1995
	200 l	4000 l

The 1994 portion has been consumed. The 1995 portion has not come.

There were no orders for CDA sprayers in 1994 (formerly they controle imperata by manual weeding or used Dalapon for the treatment). But in 1995, they made an order of 30 CDA sprayers. The CDA tried on the plantation do not give entirely satisfactory results :

- -on the one hand because, when it is windy, it is difficult to control where the glyphosate will drop,
- -on the other hand, the sprayer does not work well when the imperata is high.

So they use the knapsac sprayer getting pressure by hand.
No "big sprayer" has been ordered.

The consumption of glyphosate is 3 l for every effective ha (1/2 ha).

Two parcels were visited : the result is convincing. In 1996, the plantation will again order glyphosate.

Fertilisation :

The maximum of fertilisers has been requested.

Orders	1994	1995
urea	568 T	611 T
potash	119	107
rockphosphate	551	581

The quantity ordered in 1994 was received and incorporated in the soil. The 1995 quantiy ordered is not yet recieved (except potash).

the WB decision were respected : the fertilisers are alloted to heveas (not to intercroppings; in spite of it, there are somme 200 ha of young peanut crops) on immature cultures + 1 year (notwistanding that there are somme spreadings from other sources, on mature cultures).

The fertilisers formulas are well adapted to the age of the trees (according to GRC norm).

It is russian tractors (there is no order from WB for tractors) which carry the fertilisers to the area where they must be spread. After that, they are incorporated in the soil by hand.

Chemical research workers from Laikhe have come to draw samples of soils and leaves on 300 ha, even though there are more than 7000 ha of gray soils in Tai Ninh (limited potential of Laikhe). The results gave satisfaction and a contract has been signed. But there are 2500 ha of immature cultures. It is a beautiful area to entrust to the Agrochemistry Laboratory of Laikhe.

Fungicides :

Corticium salmonicolor : there is a little.

Orders :	1994	1995
Bordeaux mixture		
CuSO4	12 T	-
Lime	-	-
Validamycine	200 l	5000 l

Bordeaux mixture is forgotten and they only use validamycine. The 1994 order is delivered and consumed. The 1995 order was not received. As for the 1996 order, it is premature to say of it, but they will be certainly one.

There is nothing to see in the parcels because there is no coloring matter introduced in validamycine. There will be no more corticium ("pink"), since the disease will be taken away (a walk around the parcels did not allow to see only one tree affected by the corticium).

Phytophtora palmivora : there is a little.

Orders :	1994	1995
Ridomil	600 kg	600 kg

They only change difolatan to ridomil .
The 1994 order was delivered and consumed. The 1995 order is not delivered. As for the 1996 order, we thinck they will continue to presente one.

No dye, no coloring matter ; so, one see nothing on the parcels. But the important matter is the result : no black stripe. We do not see them (except sequela of attacks on very old cultures).

Stimulation :

Tapping system (including stimulation) :

Orders :	1994	1995
Etephon	7000 l / 22000 l	1000 l

The 1995 order was not very high; but one part of it was stocked in the warehouse and will be used in 1995 (order very reduced).It is a Rhone-Poulenc product.

Putting aside the new clones, such as VM 515, there are 4 principal clones in Tay Ninh : GT 1, PR 107, RRIM 600 and PB 235.
For the first 3 clones, the rule is :

-till 5 years included : no stimulation.
-from 6 to 10 years : 2,5 % (with 3 or 4 applications a year)
-beyond 11 years: 5,0 % or even more in some cases.

For PB 235 the regime is more moderate :

-from 5 to 7 years : 1,25 % (2 or 3 times a year)
-from 8 to 15 years : 2,5 %
-beyond 16 years : 5 %

PR 107 is a good clone but its latex rapidly blackens.

The D.L.

The necessity to use D.L. -which allows to optimize the tapping system- is the more imperative as there are many thousands of ha of PB 235 in tapping in Tay Ninh. It is important to invite the scientists of Laikhe Physiology / Exploitation Laboratory to come to Tay Ninh to study the problem and to sign a contract when required.

Loc Ninh

Loc Ninh

Date : 22 August 1995

Welcoming personages :

MM.	Le Van Thanh	Director
	Trung Vinh	Chief Accountant
	Nguyen Van Long	Assistant of Director of Technique & Development

Glyphosate : There is a great deal of imperata in the plantation.

Orders :	1994	1995
	3300 l / 15000 l	6600 l

It is the first time they use glyphosate against imperata ; so they were satisfied with a small quantity (formerly they use Dalapon).
The 1994 order has been delivered and entirely consumed. The 1995 order is not delivered. It is now the raining season. So, it is necessary to buy the product on the home market for it is now the time of disease.

The 1994 order for the 10 first sprayers has been delivered (CDA - Herbi 4). The 20 sprayers ordered for 1995 have not been delivered, we must buy them.
There is no need to order the "big sprayer system".

The consumption of glyphosate is 5 l/ha.

It has been seen large areas treated by glyphosate. The treatment is efficacious.

Fertilisation :

The fertilisers order was maximum. It is an important problem because there is certainly more than the half of the total area (more than 4000 ha) that meets the WB criterium of fertilisers reception.

Orders :	1994	1995
urea	719 T	863 T
potash	177	155
rockphosphate	712	823

The 1994 order has been delivered. The 1995 is not yet delivered (except potash).

The fertilisers (WB) are distributed to immature cultures + 1 year (there are fertilisers, out of WB, on mature cultures). The fertilisers spreadings are made in the form of mixtures, two times a year : before and after the raining season. They concern only the heveas (not the intercrops). It is the "red soils" formula that is used (the whole plantation is in red soils).

No tractor was ordered. On very undulated areas, unskilled workers effect the transport on their back.

A contract is made with Laikhe for sampling of soil and leaves : 2 times a year (the February 95, sampling is made ; the November 1995, one will be made soon). It is Laikhe that draws samples. There is a draw back ; Laikhe choose the samples but not necessarily the samples of the blocks that are dragging behind (what the planters would do).

Fungicides :

Corticium salmonicolor: There is a great deal

Orders	1994	1995
Bordeaux mixture		
CuSO4	14 T	10 T
Lime	70	5 0
Validamycine	420 l	10 000 l

Validamycine has resolutly dethroned Bordeaux mixture. They are biginning modestly because validamycine is a new product. The 1994 order was insufficient (all the quantity received is entirely consumed) ; but they go very rapidely to 10 000 l in 1995 (not yet received). 1996 will probably see an order as important as in 1995 (this will be debated with the planters at the end of he year).

They do not colour the product to make it visible. The question will be debated in one next GRC meeting.

Phytophtora palmivora : There is not yet Phytophtora this year (it will come with the rains).

It is Ridomil that replaces difolatan and antimucine which were used till now. It is the tappers who used the product at the request of the technical staff. No coloring matter in Ridomil.

Stimulation : Before WB, some stimulations have been practised. From now, they move rapidly.

Tapping system (including stimulation) :

Orders : the maximum allowed has been used :
-in 1994 : 23 000 l / 23 000 l. All the quantity ordered has been receved.
-in 1995 : it will be lesser : 10 000 l (not received).

The stimulant is a Rhone-Poulenc product.

Principal clones concerned : GT 1, RRIM 600 and PB 235.
Type of tapping : S/2 D/3 D/4 with one or two months of rest (so it is a tapping of feeble intensity, the half of the intensity used many years ago).

The stimulations are the following :

-till 5 years of tapping : no stimulation
-from 6 to 10 years of tapping : 1,25 % (3 to 4 times a year)
-from 11 years of tapping : 2, 50 % (3 to 4 times a year)
-after 25 years of tapping (trees have 31 years) 5 % and even more.

The increase of yield would be 20 to 30 %.

The D.L.

They know little about that technique. IRCV must go to Loc Ninh to explain it : the interlocutors are open. A contract could be signed.

VIỆN NGHIÊN CỨU CAO SU VN
BỘ MÔN NHTN

KẾT QUẢ PHÂN TÍCH

Ngày lấy mẫu: 17/02/95
Độ sâu:
Người lấy:

Số TT	Địa điểm	pHH2O	pHKCl	C%	N%	Pts(%)	Kts(%)	Pdt(mg%)	Kdt(mg%)	Ca2+(ldl%)	Mg2+(ldl%)
1	CTCS Lộc Ninh	4.03	3.54	1.59	0.123	0.009	0.008	vết	2.03	0.094	0.018

Lai Khê ngày 14 tháng 7 năm 1995
BMNHTN

Phu trách phòng phân tích

Châu Ngọc Lã

NG TY CAO SU LỘC NINH

TỔNG HỢP DIỆN TÍCH TOÀN CÔNG TY CAO SU LỘC NINH 1-1-1995

N	TRỒNG MỚI - XÂY DỰNG CƠ BẢN								SẢN XUẤT KINH DOANH													NHÓM II VÀ III	CỘNG	GHI GHÚ
									NHÓM I															
	94	93	92	91	90	89	88	TDT	88	87	86	85	84	83	82	81	79	78	77	TDT			
1		196,9	22,6	26	109,76	75,62	12	442,88		11,78	5,84	82,12	13,38	87,86	30,88	82,4			91,9	406,16		849,04	
2		8						8					49,3	142,3	51,9	132,66	28		103,1	507,26	176,1	691,36	
3		24,3	14,5	19	137,6	21		216,4														216,4	
4		134,57	10	8,4	40			192,97	120	2	36,13	43	91,8							292,93		485,9	
5	74,7	48,2	114	71,8	50		20,34	379,04	57,97	54,7	97,2	45,5	93,1	59,2	12			12		431,67		810,71	
6	90					126,86		216,86			147,32	201,45	579,92	9,41		30,94			8	977,04		1193,9	
8					174,85	154,58		329,43		120,34	416,14	356,64								893,12		1222,55	
9	137	246,8	347,2		34,1	62	62	889,1														889,1	
10	48,2	201,23			41,29		27,69	318,41		72,28	82,57	4,51			11,72	57				228,08		546,49	
11	150,1	140						290,1		16,8		76,2								93	92	475,1	
12										2,4	6,5	47,2	116,3	23,1						195,5	290,65	486,15	
L.A				139,8		74		213,8														213,8	
297				35	28			63														63	
NG	**500**	**1000**	**508,3**	**300**	**615,6**	**514,06**	**122,03**	**3559,99**	**177,97**	**280,3**	**791,7**	**856,62**	**943,8**	**321,87**	**106,5**	**303**	**28**	**12**	**203**	**4024,76**	**558,75**	**8143,5**	

Tan Bien

Tan Bien

Date : 24 August 1995

Welcoming personages :

MM.	Huynh Van Cay	Vice Director
	Duong Quoc Viet	Chief of trading Department
	Nguyen Nhi	& Chief Accountant
Mrs.	Nguyen Thi Hien	Secretary

Glyphosate :

There is some imperata on the plantations of the Group. For the control of it, the responsibles are satisfied with glyphosate . Formely, they used Dalapon.

Orders :	1994	1995
	- /21 000 l	7 000 l

Since there is no order for 1994, and the 1995 order is not delivered, the Direction think to buy the product or to borrow it.

There are not CDA sprayers ordered in 1994. In 1995, 10 sprayers were ordered but they are not delivered.

Fertilisation :

The fertilisers order was maximum. It is true that the plantation is young. Nearly the whole is in gray soil (only 200 ha in red soil). Finally, on the 5 000 ha plantable area, there are 4 000 ha planted, on which 1 700 ha are in tapping (the tapping was opened in 1991). It is a recent plantation. There is enough area to make 25 000 ha more. In their new plantings, they muste take care to obtain a better regularity in the cultures (high heterogeneity).

Orders :	1994	1995
urea	837 T	753 T
potash	136	204
rockphosphate	790	757

The 1994 order was delivered and consumed. The 1995 order is not delivered.

The WB fertilisers are reserved for immature cultures + 1 year, but other fertilisers from other sources are put on mature cultures (it is true that ,on tapped cultures, there are many newly opened). It is the heveas that receive fertilisers (not the interrops). The fertilisers are at first mixed, then spread (2 times a year : at the bebinning and at the end of raining season). There are also intercrops (for example, soya bean).

No demand for tractors addressed to WB (they used their own ones).

It was possible to see a fertilisers spreading work. The fertilisers are spread in the middle of interlines. An application is passed over to bury the fertilisers (so, the superficial roots are cuted 2 times a year...).

The research workers of Laikhe were supposed to come, some years before, to draw samples. They must come again and draw up, with the Direction, a program of continuous work for the plantation (samples of soils and leaves). A contract could be signed.

Fungicides :

Corticium salmonicolor : there is a little on the plantation.

Orders :	1994	1995
Bordeaux mixture		
CuSO4	0,5 T	-
Lime	2	-
Validamycine	-	600 l

It is clear that the Direction has made a choice : validamycine is keeped for the future. We have seen a workman with his sprayer placed at the top of a long pole, and even a very long pole. The care on PB 235, the branches of which are very high, are effected by the workman climing up a ladder (treatment is made on small areas). Unhappily, there was no order in 1994 and the 1995 order is not yet delivered.

Phytophtora palmivora : there is a little in the tapping panels.

Orders :	1994	1995
Ridomil	40 kg	350 kg

There is no choice : they must replace antimucine (prohibited) by Ridomil. Unfortunately, very little was ordered in 1994. And the 1995 order is not yet delivered. The trials already effected give good results.

It is question, for Ridomil, to make a product that colours the bark so that one can see the treated trees (mixture red soil water + an ochre colour ?).

Stimulation :

Tapping system (including stimulation)

It is not yet started (no culture in tapping since 6 years). On the other hand, there is a trial on 50 ha that must be followed up. There are here 4 main clones : PB 235, the most planted and for ahead, the GT 1, RRIM 600 and PB 231. PB 235 at 5 years old give 1400 kg/ha (on the average).

The D.L.

There is no contact with Laikhe on the stimulation. But, since there are large areas planted with "fragile" clones (PB 235), it is time to begin. The Direction seems well disposed, including the signature of a contract with Laikhe.

Phuoc Hoa

Phuoc Hoa

Date : 29 August 1995

Welcoming personages :

MM. Nguyen Phu Hoi	Chief of the Planning Department
Dong Dinh Thanh	Chief of Technical Department

Glyphosate :

There is a lot of imperata on the plantation. Formely, they used Dalapon (less efficient, the work was made by hand).To day, it is glyphosate.

Orders :	1994	1995
	20 000 l / 44 000 l	4 500 l

The order 1994 was important, but there are more than 4 000 ha of cultures with imperata (nearly 30 %).The 20 000 l ordered for 1994 were consumed. The 1995 order is not yet delivered.

40 CDA sprayers have been ordered in 1994 and they were received (+ 5 additional sprayers bought out of WB). The 1995 order (20 CDA sprayers) is not delivery. It is not convenient to controle, with CDA sprayer, the imperata plants that are higher than 0,40 m.
No "big sprayer" wes ordered.

It is easy to visit the parcels treated with glyphosate, they are in abundance everywere.

Fertilisation :

Orders :	1994	1995
urea	2237 T	1595 T
potash	645	328
rockphosphate	270	1544

The whole quantity allotted by WB was ordered in 1994 and consumed. The 1995 order is not yet delivered (except potash and urea that begin to arrive)

The whole plantation is in gray soil and, on the whole, quite poor enough. The fertilisers (WB) are put on immature cultures + 1 year. Fertilisers from other sources are put on mature cultures when the soil is quite poor (otherwise, one does not put any fertiliser). There are not any intercrops on the plantation(very poor soils).

The fertilisers are mixed before spreading (2 times a year ; at the beginning and at the end of raining season).

When required, the hiding of fertilisers in the ground is not made mechanically but by spacing out the fertilisers on the ground by bamboo-sticks. That would be beter, when the cultures become older and when the roots begin to attain the interlines, than to till - even lightly- the surface of the ground.

There were no tractors ordered. The plantation has been equipped with Russian tractors. Because there is a lot of smallholders at the immediate periphery of the plantation, the Direction does not hesitate to help them (location of tractors, contract ...).
Laikhe has never come to the plantation. But in 1996, it is expected that they will come to comfort (or modulate) the fertilisers spreading, according to the samples analysis of soils and leaves.

Fungicides :

Corticium salmonicolor : there is a lot in the plantation.

Orders :	1994	1995
Bordeaux mixture		
CuSO4	10 / 56 T	-
Lime	40 / 319	-
Validamycine	2450 l	12 000 l

The Direction of the plantation has obviously replaced Bordeaux mixture by validamycine. It is a fact that validamycine is an interesting product (and there is no scratching to be done). It is possible to have a look on the field.

The 1995 order was not delivered.

Phytophtora palmivora : there is very few.

Orders	1994	1995
Ridomil	-	2 500 kg

Formerly, they use Antimucine. To day, that product is replaced by Ridomil. Not ordered in 1994 . The 1995 order is not yet delivery.

There is no coloring matter introduced in the one or the other of these products. But a mark is made on the trunk of the trees treated against Corticium.

Stimulation :

Not any experimentation was made on the plantation.

Orders :	1994	1995
	1 000 L / 5 000 L	1 000 L

The quantity ordered in 1994 will be used in October 1995. It is a Rhone-Poulenc product.

One can stimulate on the tapping cut (without scratching) or below the tapping cut with scratching. The first system looks better.

For the clones GT 1 and RRIM 600, it will be the traditional formula :

- 5 years of tapping without stimulation,
- from 6 to 10 years of tapping, 2 or 3 times a year with a product at 2,5 %,
- from 11 years of tapping and beyond, it is possible to use stimulation at 5 %.

PB 235 special case : the concentration begins at 1,25 % and increase little by little. In fact, one must be careful. The stimulation of PB 235 is something difficult. The D.L. technique can be useful.

The interlocutor had no knowledge of D.L., but they all are well disposed.

Phu Rieng

Phu Rieng

Date : 31 August 1995

Welcoming personages :

MM.	Vo Manh Sam	Deputy Director of Rubber Company
	Nguyen Thuyen	Accountant

Glyphosate : There is an important problem of imperata in the plantation.

Orders :	1994	1995
glyphosate :	45 000 l / 49 000	18 810 l

The 1994 order was high. The 1995 order was not delivered. Formerly, they use Dalapon. But that product has not the quality of glyphosate which is efficient and controls imperata well.

24 CDA sprayers (WB) are received, but they are not enough (necessity to buy others). On the other hand, no "big spayer system" is requested : the treatments are effected by "big sprayer" home made and hitched to (Russian ?) tractors.

Glyphosate consumption : 5 l / ha.

One can visite the parcels treated by glyphosate (2 months after the treatment).

Fertilisation :

The order is entirely taken.

Orders :	1994	1995
urea	2 165 T	1 805 T
potash	465	452
rockphosphate	2 107	1 793

The 1994 order was delivered. They are waiting now for the delivery of the 1995 order. There are more than 7 000 ha of immature cultures (+ 1 year) that received the WB fertilisers. But other fertilisers (out of WB) are also put in mature cultures.

Fertilisers are spread in mixture two times a year : before and after the raining season. They are reserved for heveas and not for intercrops (rice especially). The formula take into account the quality of soils and the age of trees.

The spreadings are incorporated in the soil by hand (at 1 to 3 years old) around the plants (one can "treat " the interlines without much risk to cut the plant roots). The formula is given par GRC.

No tractor (WB) is ordered. The plantation has its own tractors.

The research workers of Laikhe have come last year to draw samples of soils and leaves. The conclusions was the efficiency of GRC formula.

Though there is nothing visible, one can go and see on the field.

Fungicides :

Corticium salmonicolor : there is a lot of Corticium.

Orders :	1994	1995
	----	----
Bordeaux mixture		
CuSO4	13 700 /42 000 kg	-
Lime	78 500/ 243 000 kg	-
Validamycine :	4 000 l	8 500 l

The choice is made rapidly : validamycine. In fact, There are two similar products : the home made Validamycine, and the validacine bought from abroad (better quality). The two are used today. The 4 000 l of the 1994 order (WB) was entirely consumed : this validacine has a high quality. The 8 500 l ordered for 1995 are not yet receved.

One could go and see in the field the treated trees; unfortunately the rain prevented us to go there.

Phytophtora palmivora :

Orders :	1994	1995
	----	----
Ridomil :	1 770 kg	1 000 kg

Ridomil has taken the place of Difolatan.

The quality ordered in 1994 was delivered and consumed.

They are in waiting for the delivery of the 1995 order. The 1996 order must be studied.

Stimulation :

Tapping system (including stimulation)

The plantation has used stimulation on old cultures (practically, it is no more of that). For the starting of stimulations on normal cultures, it will be necessary to wait for 1996 (GRC norms).

The stimulant is a Rhone-Poulenc product.

The D.L.

The technical services have never heard of D.L.. But they are ready to receive the emissaries of Laikhe to discuss the matter with a view to sign a contract.

Annex

Areas and estimated yields
of the plantations in 1995.

MAFI
GERUCO

SOCIALIST REPUBLIC OF VIETNAM
Independence - Freedom - Happiness

TABLE OF RUBBER PLANTED AREA - PRODUCTIVITY - YIELD IN 1995

No	NAME OF UNITS	AREA						ESTIMATED AVERAGE PRODUCTIVITY		YIELD			NOTICE
		TOTAL	IMMATURE			NEW PLANTING + REPLANTING	MATURE	ACCORDING TO GERUCO	ACCORDING TO UNIT	TOTAL	PLANNED	ABOVE	
			TOTAL	NORMAL	DELAYED								
		ha	ha	ha	ha	ha	ha	kg/ha	kg/ha	ton.	ton.	ton.	
	TOTAL (A + B)	184,608	53,548	42,360	11,188	6,843	124,217	12,998	4,430	110,000	105,900	4,100	
A	SOUTHESTERN COMP.	163,586	41,333	34,435	6,898	5,143	117,110	9,662	4,430	106,850	102,750	4,100	
1	PHÚ RIỀNG	19,066	5,778	4,451	1,327	300	12,988	793	740	10,300	9,700	600	
2	DẦU TIẾNG	29,369	5,289	3,611	1,678	400	23,680	950	880	22,500	21,000	1,500	
3	BÌNH LONG	16,176	5,168	4,152	1,016	506	10,502	878		9,200	9,200		
4	ĐỒNG PHÚ	8,124	3,013	2,741	272	800	4,311	990	920	4,200	4,000	200	
5	PHƯỚC HÒA	17,223	3,341	1,935	1,406	50	13,832	506		7,000	7,000		
6	LỘC NINH	8,899	3,138	2,924	214	850	4,911	977	875	4,800	4,300	500	
7	ĐỒNG NAI	39,170	8,408	7,653	755	1,200	29,562	1,059	1,015	31,300	30,000	1,300	
8	BÀ RỊA	13,628	2,657	2,427	230	301	10,670	1,096		11,700	11,700		
9	TÂY NINH	7,035	2,021	2,021		360	4,654	988		4,600	4,600		
10	TÂN BIÊN	4,314	2,312	2,312		300	1,702	587		1,000	1,000		
11	RUBBER RESEARCH INSTITUT	582	208	208		76	298	838		250	250		
B	HIGHLAND COMP. + QUANGT	21,022	12,215	7,925	4,290	1,700	7,107	3,336		3,150	3,150		
1	KRÔNGBUK	1,739	921	607	314	100	718	418		300	300		
2	EAHLEO	1,947	884	500	384	200	863	405		350	350		
3	MANGYANG	3,588	2,422	1,210	1,212	200	966	238		230	230		
4	CHƯSÊ	3,697	2,209	1,479	730	200	1,288	388		500	500		
5	CHƯPAH	2,039	927	733	194	300	812	455		370	370		
6	KONTUM	1,590	968	830	138	300	322	310		100	100		
7	CHUPRÔNG	3,394	1,757	1,347	410	300	1,337	748		1,000	1,000		
8	QUẢNG TRỊ	3,028	2,127	1,219	908	100	801	374		300	300		

Hồ Chí Minh City, 22/4/1995

DIRECTOR GENERAL

Annex

Progress of yields from 1992 to 1995 (estimated)

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
ĐỘC LẬP TỰ DO HẠNH PHÚC

TP. Hồ chí Minh, ngày 18 / 3 /1994

1993

BÁO CÁO

THỰC HIỆN KẾ HOẠCH SẢN XUẤT TÀI CHÍNH NĂM 1993

CHỈ TIÊU	ĐVT	TỔNG SỐ	PHÚ RIỀNG	DẦU TIẾNG	BÌNH LONG	ĐỒNG PHÚ	PHƯỚC HÒA	LỘC NINH	ĐỒNG NAI	TÂY NINH	TÂN BIÊN
A	B	C	1	2	3	4	5	6	7	8	9
A-SẢN XUẤT KINH DOANH											
I-GIÁ TRỊ TỔNG SẢN LƯỢNG	1000đ	813.650.338	72.345.837	127.739.086	68.322.132	29.313.494	43.182.451	39.582.500	322.839.774	42.997.306	18.115.740
1-Giá trị sản lượng hàng hoá cao su	_	695.058.637	53.665.000	112.175.711	54.750.674	19.265.641	24.585.189	29.427.000	271.536.672	30.050.615	1.377.554
2-Giá trị xây lắp tự làm	_	198.973.167	18.680.837	15.563.375	13.571.458	10.047.853	18.597.262	10.155.500	51.249.102	7.527.959	6.238.185
Trong đó: Đơn vị ủy thác		7.000.000									
3-Giá trị sản phẩm khác	_	5.618.734	_	_	_	_	_	_		5.618.734	_
II-DIỆN TÍCH, NĂNG SUẤT, SẢN LƯỢNG											
1-Diện tích cao su khai thác	Ha	101.819,13	9.939,56	18.582,89	9.549,13	4.090	5.824,19	5.775	38.558,04	4.766,77	654,96
2-Năng suất	Kg/ha	738	734	722	719	622	572	684	840	724	555
3-Sản lượng											
a-Khai thác	Tấn	75.099	7.300	13.427	6.868	2.545	3.330	3.950	32.391	3.450	364
b-Chế biến	_	77.483	7.350	13.806	7.254	2.560	3.330	3.930	33.130	4.631	_
c-Tiêu thụ	_	80.664	7.350	14.189	7.226	2.656	3.303	3.950	34.930	4.993	364
-Bán và ủy thác cho TCT thuộc CT XK	_	11.646	150	3.511	1.093	114	150	816	3.699	2.155	_
-Nội địa	_	69.038	7.200	10.678	6.133	2.542	3.153	3.134	31.231	2.838	364
III-GIÁ THÀNH, GIÁ BÁN											
1-Giá thành b/q 1tấn mủ thành phẩm(có thuế)	Đồng	6.789.247	6.715.500	6.200.040	6.405.195	6.900.000	6.400.460	6.536.984	7.200.302	6.642.430	
2-Giá thành b/q 1tấn mủ nước (-)	_	5.651.338	_	_	_	_	_	_	_	_	5.160.950
TỔNG GIÁ THÀNH	1000đ	536.505.517	49.358.925	87.972.381	46.282.306	18.326.400	21.140.718	26.295.087	251.511.458	22.922.850	1.377.554
1-Giá bán b/q 1tấn mủ thành phẩm	Đồng	7.679.094	7.300.000	7.905.822	7.577.000	7.253.630	7.443.297	7.450.000	7.775.234	7.889.393	
1-Giá bán b/q 1tấn mủ nước	_	5.551.194									
TỔNG DOANH SỐ	1000đ	606.225.944	53.655.000	112.175.711	54.750.674	19.265.641	24.585.189	29.427.000	271.536.672	30.050.615	1.377.554

VIỆN CAO SU	CHƯ PAH	CHƯ PRONG	KRONG BUK	EAH'LEO	CHƯ SÊ	MANG YANG	KON TUM	QUẢNG TRỊ
10	11	12	13	14	15	16	17	18
1.751.388	4.849.042	11.010.152	3.498.000	4.447.646	6.935.520	6.124.503	4.103.863	7.495.604
1.031.388	2.640.923	5.167.935	457.000	550.000	858.944	349.503	97.500	490.390
720.000	2.208.119	5.842.217	3.041.000	3.897.646	6.076.576	5.775.000	4.006.363	7.004.714
_	_	_	_	_	_	_	_	_
281	778	874	540	497,12	867	370	73,45	288
562	398	677	165	217	336	189	204	309
158	310	592	89	109	123	70	15	39
158	310	694	_	_	118	70	15	89
158	392	726	89	100	123	55	15	63
_	_	_	_	_	_	_	_	_
158	392	726	89	100	123	55	15	63
-	6.737.000	5.911.814	_	_	6.710.162	6.377.797	6.500.000	7.302.019
5.426.715	_	_	6.397.114	6.674.900	_	_	_	_
857.421	2.640.923	4.289.021	615.636	667.490	827.363	349.503	97.500	472.981
	6.737.000	7.123.724	_	_	6.966.284	6.377.797	6.500.000	7.573.589
6.830.335	_	_	5.140.000	5.800.000	_	_	_	_
1.031.388	2.640.923	5.167.935	457.000	550.000	858.944	349.503	97.500	490.390

Bộ Nông nghiệp và CNTP
TỔNG CÔNG TY CAO SU VIỆT NAM
Số : 438 /KHVT.BC

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

TP. Hồ Chí Minh, ngày 26 / 5 / 1995

BÁO CÁO THỰC HIỆN KẾ HOẠCH SẢN XUẤT TÀI CHÍNH NĂM 1994

CHỈ TIÊU	ĐVT	TỔNG SỐ	Phú Riềng	Dầu Tiếng	Bình Long	Đồng Phú	Phước Hoà	Lộc Ninh	Đồng Nai	Bà Rịa	Tây Ninh	Tân Biên	Viện Cao su	Chư Păh	Chư Prông	Krông Buk	Eah'Leo	Chư Sê	Mang Yang	Kon Tum	Quảng Trị
A	B	C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
A- SẢN XUẤT KINH DOANH																					
I. GIÁ TRỊ TỔNG SẢN LƯỢNG	1000đ	1.272.740.003	107.633.181	231.888.859	113.125.807	47.415.143	83.026.614	62.736.359	378.241.224	102.858.662	68.901.394	15.189.105	2.228.592	5.462.251	16.366.032	5.064.240	6.314.449	9.852.634	4.874.000	2.662.000	8.899.457
1- Giá trị sản lượng hàng hoá CSu	-	1.056.245.312	86.759.550	208.826.039	96.318.721	36.382.132	62.065.100	51.542.790	332.854.133	98.414.651	50.750.452	6.019.585	1.440.000	3.590.251	10.356.619	1.696.240	2.452.449	2.927.471	1.200.000	388.000	2.261.129
2- Giá trị xây lắp tự làm	-	207.616.999	20.873.631	23.062.820	16.807.086	11.033.011	20.961.514	11.193.569	45.387.091	4.444.011	9.273.250	9.169.520	788.592	1.872.000	6.009.413	3.368.000	3.852.000	6.925.163	3.674.000	2.274.000	6.638.328
3- Giá trị sản phẩm khác	-	8.877.692									8.877.692										
II. DIỆN TÍCH, NĂNG SUẤT, SẢN LƯỢNG																					
1. Diện tích cao su khai thác	ha	110.677,25	10.928,14	21.991,65	9.647,67	3.828	9.221,14	5.518	28.415	10.540	4.590,44	703,45	295,35	839,32	1.025,2	524,1	863,15	578,39	570	101,25	497
2. Năng suất	Tấn/ha	0,86	0,79	0,84	0,83	0,98	0,67	0,76	0,98	1,02	0,89	0,99	0,61	0,40	0,84	0,44		0,43	0,246	0,395	0,42
3. Sản lượng																					
a) Khai thác	Tấn	94.859	8.600	18.550	8.013	3.741	6.200	4.208	27.489	10.758	4.084	699	180	334	864	233	265	251	140	40	210
b) Chế biến	-	96.593	8.600	18.742	8.442	3.788	6.200	4.208	31.237	7.483	6.094			334	864			251	100	40	210
c) Tiêu thụ	-	100.693,86	8.700	19.456	8.799	3.695	6.200	4.670	32.266	7.483	6.110	689	180	336	956,86	233	265	280	125	40	210
- Bán và ủy thác cho Tổng Công ty thuộc chỉ tiêu xuất khẩu.	-	9.197	70	3.862	392		293		2.137	557	1.886	-	-	-	-	-	-	-	-	-	-
- Nội địa	-	91.496,86	8.630	15.594	8.407	3.695	5.907	4.670	30.129	6.926	4.224	689	180	336	956,86	233	265	280	125	40	210
I. TÀI CHÍNH																					
1- Giá thành																					
1.1.Giá thành bq 1 tấn mủ Th.Phẩm	đồng	6.868.088	7.150.430	6.347.984	6.937.852	7.435.224	6.499.000	6.500.000	7.232.559	6.600.000	5.988.139			8.350.000	8.240.097			7.900.000	8.200.000	8.996.000	8.253.248
1.2.Giá thành bq 1 tấn mủ nước	-	6.803.350										6.258.796	6.050.000			7.280.000	8.300.000				
TỔNG GIÁ THÀNH	1000đ	677.659.145	62.208.747	124.031.560	61.046.250	27.474.617	40.293.800	30.355.000	233.365.758	49.387.800	24.192.083	4.315.440	1.089.000	2.789.079	7.884.619	1.696.240	2.199.500	2.211.210	1.025.000	359.840	1.733.602
2- Giá bán																					
2.1.Giá bán BQ 1 tấn mủ Th.Phẩm	đồng	10.692.389	9.972.362	10.733.263	10.946.550	9.847.114	10.010.500	11.037.000	10.315.940	13.150.070	11.542.342			10.700.878	10.823.472			10.458.990	9.600.000	9.700.000	10.767.281
2.2.Giá bán BQ 1 tấn mủ nước	-	8.491.787										8.730.362	8.000.000			7.280.000	9.262.000				
TỔNG DOANH THU	1000đ	1.052.125.921	86.759.550	208.826.039	96.318.721	36.382.132	62.065.100	51.542.790	332.854.133	98.414.651	46.631.061	6.019.585	1.440.000	3.590.251	10.356.619	1.696.240	2.452.449	2.927.471	1.200.000	388.000	2.261.129
3- Lợi nhuận cao su																					
- Trước thuế lợi tức	1000đ	374.466.776	24.550.803	84.794.479	35.272.471	8.907.515	21.771.300	21.187.790	99.488.375	49.026.851	22.438.978	1.704.145	351.000	801.172	2.472.000		252.949	716.261	175.000	28.160	527.527
- Trong đó : Sau thuế lợi tức	-	243.403.404	15.958.022	55.116.411	22.927.106	5.789.885	14.151.345	13.772.063	64.667.444	31.867.453	14.585.336	1.107.694	228.150	520.762	1.606.800	111.000	164.417	465.570	113.750	18.304	342.892
- Lãi XDCB	-	10.835.091	1.043.681	1.622.588	840.354	739.212	1.200.000	559.678	2.269.354	177.760	443.885	218.630	54.000	179.512	350.927	168.400	210.396	346.258	183.700	113.700	113.056
4- Các khoản nộp ngân sách	1000đ	133.085.099	33.840.459	46.398.968	18.799.443	11.974.010	12.872.050	10.769.370	61.955.232	13.219.000	10.626.258	1.878.304	277.000	1.368.579	1.904.709	304.330	2.946.532	734.444	803.602	588.900	633.909
- Thuế sử dụng đất và thuế NN	-	58.739.758	4.768.000	12.615.000	5.310.577	1.950.000	4.881.000	2.580.000	17.500.000	3.200.000	1.644.000	250.144	155.000	307.207	400.000	111.000	2.629.000	114.925	101.750	58.700	168.455
- Thuế sử dụng đất và thuế vốn	-	33.238.268	11.459.482	2.700.000	1.817.256	3.450.000	2.400.000	1.400.000	5.500.000	1.000.000	1.077.000	287.092	-	149.744	220.793	167.000	50.000	90.626	148.000	156.100	165.165
- Thuế lợi tức	-	43.547.094	4.290.854	19.223.000	8.500.000	2.002.660	2.115.000	2.000.000	3.750.000	6.000.000	5.230.000	200.000	66.000	4.443	50.317	-	88.532	24.590	1.600	-	-
- Khấu hao cơ bản	-	54.100.977	10.990.689	6.900.000	3.100.000	3.136.000	1.867.000	2.684.000	17.000.000	3.000.000	2.422.000	489.000	56.000	651.000	503.496	116.330	179.000	232.787	193.536	256.300	299.829
- Thuế doanh thu	-	33.200			41.600									30.025				16.564			

1992	Production	areas tapped	kg / ha
Phu Rieng			547
Dau Tieng			606
Binh Long			622
Dong Phu			431
Phuoc Hoa			429
Loc Ninh			606
Dong Nai			737
Tay Ninh			675
Tan Bien			-
1993			
Phu Rieng	7 300 T	9 939, 58	734
Dau tieng	13 427	18 582, 89	723
Binh Long	6 788	9 549, 13	711
Dong Phu	2 545	4 090	622
Phuoc Hoa	3 330	5 824, 19	572
Loc Ninh	3 950	5 775	684
Dong Nai	32 391	38 568, 04	840
Tay Ninh	3 450	4 766, 77	724
Tan Bien	364	654, 96	556
	73 545 T	97 750, 56	752
1994			
Phu Rieng	8 600 T	10 928, 14	787
Dau Tieng	18 550	21 991, 65	844
Binh Long	8 013	9 647, 67	831
Dong Phu	3 741	3 828	977
Phuoc Hoa	6 200	9 221, 14	672
Loc Ninh	4 208	5 518	763
Dong Nai	27 489	28 415	967
Ba Ria	10 758	10 540	1 021
Tay Ninh	4 084	4 590, 44	890
Tan Bien	699	703, 45	994
	92 342 T	105 383, 49	876
1995 (estimation GRC)			
Phu Rieng	10 300 T	12 988	793
Dau Tieng	22 500	23 680	950
Binh Long	9 200	10 502	876
Dong Phu	4 200	4 311	974
Phuoc Hoa	7 000	13 832	506
Loc Ninh	4 800	4 911	977
Dong Nai	31 300	29 562	1 059
Ba Ria	11 700	10 670	1 097
Tay Ninh	4 600	4 654	988
Tan Bien	1 000	1 702	588
	106 600 T	116 812	913

Yields by year

	1992	1993	1994	1995 Prévis.
Phu Rieng	547	734	787	793
Dau Tieng	606	723	844	950
Binh Long	622	711	831	876
Dong Phu	431	622	977	974
Phuoc Hoa	429	572	672	506
Loc Ninh	606	684	763	977
Dong Nai	737	840	967	1059
Ba Ria			1021	1097
Tay Ninh	675	724	890	988
Tan Bien	-	556	994	588
		752	876	913

D'après ces chiffres, il est clair que, globalement, les rendements se sont accrus de 1992 à 1993, puis de 1993 à 1994. Les chiffres de 1995 sont des estimations faites par GRC. Elles restent dans la même mouvance.

Chacune des plantations, prises indviduellement, a augmenté substantiellement son rendement / ha. On est loin des rendements de 1992 (de l'ordre de 500 kg/ha). On se siturait aujourd'hui aux environs de 900 kg / ha.

Enfin il y a 6 plantations qui touchent les rendements se situant entre 950 et 1050 kg / ha. La situation n'est pas désespérée.

Annex

Yields projection from 1996
to 2005 (10 years).

P.A I Trồng mới 68.528 ha (1996 - 2005 ha)

DỰ KIẾN KẾ HOẠCH SẢN LƯỢNG DÀI HẠN 10 NĂM T 1996 - 2005

ĐƠN VỊ	1996 DT KHAI THÁC (HA)	1996 Trong đó mở cao trong năm (ha)	1996 NS kg/ha	1996 Sản lượng (tấn)	1997 DT KHAI THÁC (HA)	1997 Trong đó mở cao trong năm (ha)	1997 NS kg/ha	1997 Sản lượng (tấn)	1998 DT KHAI THÁC (HA)	1998 Trong đó mở cao trong năm (ha)	1998 NS kg/ha	1998 Sản lượng (tấn)	1999 DT KHAI THÁC (HA)	1999 Trong đó mở cao trong năm (ha)	1999 NS kg/ha	1999 Sản lượng (tấn)	2000 DT KHAI THÁC (HA)	2000 Trong đó mở cao trong năm (ha)	2000 NS kg/ha	2000 Sản lượng (tấn)	2001 DT KHAI THÁC (HA)	2001 Trong đó mở cao trong năm (ha)	2001 NS kg/ha
4-Đông nam bộ	125,878.58	10,974.06	972	122,400	129,742.91	5,965.41	1,067	138,399	134,699.32	6,907.41	1,165	156,950	139,619.44	5,960.12	1,236	172,600	143,638.71	4,688.27	1,305	187,620	148,224.63	5,284.94	1,356.52
CTy Đồng nai	31,288.69	2,000.00	1,119	35,000	31,890.44	1,271.75	1,226	39,100	32,729.98	1,509.54	1,302	42,600	33,406.28	1,346.30	1,338	44,700	33,270.56	534.28	1,392	46,300	33,079.87	508.31	1,423.83
Bà rịa	10,546.92	132.00	1,280	13,500	10,846.92	300.00	1,364	14,800	11,262.42	415.50	1,403	15,800	11,712.42	450.00	1,417	16,600	12,212.42	500.00	1,441	17,600	12,692.15	479.73	1,473.35
Bình long	10,795.64	993.19	1,019	11,000	10,893.73	448.09	1,212	13,200	11,216.63	672.90	1,293	14,500	11,575.43	728.80	1,348	15,600	12,367.13	791.70	1,384	17,120	13,502.27	135.14	1,399.76
Lộc ninh	5,516.81	578.00	997	5,500	5,565.93	328.12	1,096	6,100	5,820.73	533.80	1,168	6,800	6,605.46	784.73	1,166	7,700	7,075.74	470.28	1,215	8,600	7,692.73	616.99	1,234.93
Phú riềng	14,316.66	1,327.87	810	11,600	15,320.76	986.10	888	13,600	16,139.84	819.08	979	15,800	17,108.72	968.88	1,075	18,400	18,053.93	945.21	1,135	20,500	18,667.53	613.60	1,216.02
Đồng phú	5,163.72	851.00	930	4,800	5,671.86	508.14	987	5,600	6,223.90	552.04	1,060	6,600	6,530.06	306.16	1,194	7,800	6,794.54	264.48	1,251	8,500	7,221.78	427.24	1,294.69
Phước hoà	14,831.97	1,000.00	607	9,000	15,321.70	489.73	705	10,800	16,141.29	819.59	768	12,400	16,570.47	429.18	857	14,200	16,757.50	187.03	982	16,450	16,944.53	187.03	1,062.29
Dầu tiếng	25,997.67	2,000.00	962	25,000	26,070.35	372.68	1,132	29,500	26,637.76	821.41	1,239	33,000	27,113.04	475.28	1,346	36,500	27,498.28	384.24	1,436	39,500	28,012.40	514.12	1,520.76
Tây ninh	4,550.25	303.00	1,143	5,200	4,449.85	299.60	1,281	5,700	4,385.35	313.50	1,414	6,200	4,785.35	400.00	1,484	7,100	5,190.55	405.20	1,580	8,200	5,701.62	511.07	1,490.80
Tân biên	2,548.74	846.00	589	1,500	3,349.94	801.20	630	2,110	3,748.59	398.65	747	2,800	3,819.38	70.79	916	3,500	4,011.49	192.11	1,072	4,300	4,262.99	251.50	1,196.34
Viên CS	321.43	43.00	933	300	361.43	60.00	996	360	392.83	51.40	1,146	450	392.83		1,273	500	406.57	13.74	1,353	550	446.78	40.21	1,387.71
3-TN+QT	10,659.17	3,804.91	439	4,420	11,272.60	1,213.42	499	5,070	12,578.36	1,305.76	614	7,720	13,926.01	1,347.65	684	9,530	15,109.28	1,182.97	762	11,520	16,623.25	1,518.97	811.51
KrongBuk	1,018.50	300.00	403	410	1,057.90	39.40	539	570	1,109.45	51.55	595	660	1,186.40	76.95	641	760	1,245.35	58.95	707	880	1,280.30	34.95	820.12
Eah leo	1,083.15	220.00	415	450	1,155.09	71.94	545	630	1,216.18	61.09	600	730	1,253.52	37.34	670	840	1,300.13	46.61	738	960	1,362.90	62.77	843.79
Chưsê	1,690.95	471.00	384	650	1,926.56	235.61	519	1,000	2,183.76	257.20	577	1,260	2,559.05	375.29	656	1,680	2,768.09	209.04	723	2,000	3,021.68	253.59	794.26
ChuProng	1,691.00	340.70	804	1,360	1,836.70	145.70	915	1,680	2,066.10	229.40	1,016	2,100	2,366.75	300.65	1,056	2,500	2,629.27	262.52	1,141	3,000	2,993.89	364.61	1,102.25
ChuPăh	1,046.00	233.40	430	450	1,127.14	81.14	479	540	1,297.08	169.94	509	660	1,374.84	77.76	626	860	1,513.50	138.66	740	1,120	1,713.50	200.00	700.32
Kontum	450.00	127.95	333	150	482.95	32.94	456	220	558.56	75.61	591	330	680.68	122.12	705	480	806.29	125.51	781	630	1,034.75	228.46	831.12
MangGiang	1,774.00	807.86	254	450	1,976.46	202.46	354	700	2,228.74	252.28	417	930	2,272.04	43.30	506	1,150	2,334.72	62.38	583	1,360	2,514.01	179.29	624.50
Quảng trị	1,305.57	504.00	383	500	1,709.80	404.23	427	730	1,918.49	208.69	547	1,050	2,232.73	314.24	564	1,260	2,511.93	279.20	625	1,570	2,702.23	190.30	725.33
TỔNG CỘNG	135,937.67	13,078.97	933	126,820	141,015.51	7,178.84	1,024	144,469	147,277.68	8,213.17	1,118	164,670	153,545.45	7,307.77	1,186	182,130	158,747.99	5,871.24	1,254	199,140	164,847.90	6,798.91	1,381.56

05

		2003				2004				2005			
NS kg/ha	Sản lượng (tấn)	DT KHAI THÁC (HA	Trong đó mở cao trong năm (ha)	NS kg/ha	Sản lượng (tấn)	DT KHAI THÁC (HA)	Trong đó mở cao trong năm (ha)	NS kg/ha	Sản lượng (tấn)	DT KHAI THÁC (HA)	Trong đó mở cao trong năm (ha)	NS kg/ha	Sản lượng (tấn)
1,356.52	201,870	155,021.42	3,021.72	1,465	227,030	161,849.19	6,627.77	1,559	244,230	166,838.19	4,989.00	1,561	260,470
1,423.83	47,100	34,444.83	614.96	1,486	51,200	35,999.83	1,555.00	1,500	54,000	37,339.83	1,340.00	1,545	57,700
1,473.35	18,700	13,161.38	211.89	1,550	20,400	13,373.27	211.89	1,600	21,400	13,628.27	255.00	1,651	22,500
1,399.76	18,900	14,406.77	452.23	1,492	21,500	15,456.77	1,050.00	1,527	23,600	16,176.77	720.00	1,576	25,500
1,234.93	9,500	8,534.99	283.77	1,336	11,400	9,097.76	562.77	1,374	12,500	9,376.76	279.00	1,450	13,600
1,216.02	22,700	19,539.43	600.00	1,418	27,700	20,989.54	1,450.11	1,458	30,600	21,889.54	900.00	1,535	33,600
1,294.69	9,350	8,061.13	279.78	1,402	11,300	8,340.13	279.00	1,487	12,400	8,340.13		1,559	13,000
1,062.29	18,000	17,223.54	175.01	1,266	21,800	17,223.54		1,392	23,980	17,223.54		1,469	25,300
1,520.76	42,600	28,393.50	190.60	1,586	45,100	28,993.50	600.00	1,621	47,000	29,269.50	276.00	1,657	48,500
1,490.80	8,500	6,069.12	7.50	1,602	9,720	6,658.12	589.00	1,592	10,600	7,247.12	589.00	1,587	11,500
1,196.34	5,100	4,674.95	205.98	1,320	6,170	5,174.95	500.00	1,418	7,340	5,774.95	600.00	1,455	8,400
1,387.71	620	511.78		1,446	740	541.78	30.00	1,495	810	571.78	30.00	1,522	870
811.51	13,490	19,381.17	1,351.40	977	18,930	25,639.53	5,257.36	868	22,250	32,493.53	6,854.00	912	29,623
820.12	1,050	1,530.80	175.50	980	1,500	2,377.80	847.00	950	2,260	3,300.80	923.00	848	2,800
843.79	1,150	1,662.90	200.00	992	1,650	2,512.90	850.00	955	2,400	3,362.90	850.00	892	3,000
794.26	2,400	3,595.72	220.57	993	3,570	4,634.22	1,038.50	962	4,460	5,734.22	1,100.00	977	5,600
1,102.25	3,300	3,294.49	100.00	1,366	4,500	4,112.49	818.00	827	3,400	5,131.49	1,019.00	1,247	6,400
700.32	1,200	2,313.50	300.00	808	1,870	3,431.50	1,118.00	798	2,740	4,366.50	935.00	779	3,400
831.12	860	1,249.18	104.63	961	1,200	2,304.18	1,055.00	781	1,800	3,494.18	1,190.00	644	2,250
624.50	1,570	2,815.01	160.70	707	1,990	3,295.61	480.60	698	2,300	4,074.61	779.00	704	2,870
725.33	1,960	2,920.57	100.00	907	2,650	2,970.83	50.26	976	2,900	3,028.83	58.00	1,090	3,300
1,301.56	214,560	174,403.59	4,383.12	1,410	245,950	187,465.72	13,085.13	1,421	266,490	199,331.72	11,843.00	1,455	290,090